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# Poverty and Shared Prosperity Implications of Deep Integration in Eastern and Southern Africa

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**Abstract:** Evidence indicates that trade costs are a much more substantial barrier to trade than tariffs, especially in sub-Saharan Africa. We decompose trade costs into: (i) trade facilitation; (ii) non-tariff barriers; and (iii) the costs of business services. We assess the poverty and shared prosperity impacts of deep integration to reduce these three types of trade costs in: (i) the East African Customs Union (EACU)-COMESA-SADC "Tripartite" FTA; (ii) within the EACU alone; and (iii) unilaterally by the EACU. We employ an innovative multi-region computable general equilibrium (CGE) model to estimate the changes in the macroeconomic variables that impact poverty and shared prosperity. We utilize the CGE model estimates in the Global Income Distribution Dynamics (GIDD) microsimulation model to obtain assessments of the changes in the poverty headcount and shared prosperity for each of our simulations for each of our six African regions or countries. We find that these reforms are pro-poor. There are significant reductions in the poverty headcount and the percentage of the population living in poverty for all six of our African regions from deep integration in the Tripartite FTA or comparable unilateral reforms by the EACU. Further, the incomes of the bottom forty percent of the populations noticeably increase in all countries or regions of our model that are engaged in the trade reforms. The reason the poor share in the prosperity is due importantly to the fact that the reforms increase unskilled wages faster than rewards of other factors of production, as the reforms tend to favor agriculture. Despite the uniform increases in income for the poorest 40 percent, we find some cases where the *share* of income captured by the poorest 40 percent of the population decreases. We find that the estimated gains vary considerably across countries and reforms. Thus, countries would have an interest in negotiating for different reforms in different agreements.

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**JEL categories:** F14; F15; F17; O55; F55.

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## 1. Introduction

Evidence is now substantial that with the progressive global decline in tariffs over several decades, trade costs are often a much more substantial barrier to trade than tariffs.[2] Moreover, trade costs are especially high in sub-Saharan Africa compared to other regions in the world. For example, the World Economic Forum (2012) found that it is still considerably more expensive to trade with Africa than with other regions, and, in many cases, the cost of trading is a more important obstacle to trade development than trade policies.[3]

Countries in Eastern and Southern Africa, however, are attempting to address the high trade costs through regional initiatives. Notably, the proposed 26 member country Tripartite Free Trade Area (Tripartite FTA) (among the East African Community (EAC), the Common Market of East and Southern Africa (COMESA) and South African Development Community (SADC)) has

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[2] See, for example, Hummels *et al*., (2007) or Hummel and Schaur (2013).

[3] Brenton and Isik (2012) have also documented the high costs of trading in sub-Saharan Africa. See also, the estimates of Hummels *et al*., (2007) and Minor (2013).

programs in place for trade and transport facilitation and the reduction of non-tariff barriers, and has the objective in "Phase II" to liberalize trade in services.[4] The members of the EACU also have initiatives within the EACU to similarly reduce trade costs.[5] In this paper, we assess the impacts of deep integration to reduce trade costs in the Tripartite FTA on poverty and shared prosperity. In order to assess the relative gains of narrowing or widening the reforms, we also assess the impacts on poverty and shared prosperity of comparable reforms by the members of the EACU applied only within the EACU and more widely if the EACU unilaterally extends the reforms to all countries, where feasible.

We decompose trade costs into three categories: costs that can be lowered by **trade facilitation; non-tariff barriers;** and the costs of **business services.** Trade facilitation addresses costs such as delays at border crossing, roadblocks for trucks and the necessity to pay bribes. Regarding **non-tariff barriers,** recent work by Cadot and Gourdon (2014) has shown that the old command and control non-tariff barrier measures have significantly declined, but standards as barriers to trade have supplanted them in importance. Further, poor **business services** for trade are also a problem. Improvements in a wide range of business services such as banking, insurance, communication and professional services such as legal, auditing, engineering and computer services would also lower trade costs. This also includes poor transportation services, such as very poor or non-existent freight train services in many countries of sub-Saharan Africa, delays at ports and poor air freight services in many countries.

We obtain results for poverty and shared prosperity in several African countries by first assessing the impacts on the variables that impact poverty and shared prosperity in a computable general equilibrium (CGE) model. We build on the ten region, 19-sector global CGE trade model of Balistreri, Tarr and Yonezawa (forthcoming, *Journal of African Economies*) and in Balistreri, Tarr and Yonezawa (2014), hereafter BTY.[6] The model contains Kenya, Tanzania, Uganda, Rwanda,[7] COMESA, SADC, the US, EU, China and Rest of the World. Using the comparative

[4] See http://www.comesa-eac-sadc-tripartite.org/intervention/focal_areas/trade_facilitation, Pearson (2013) and the East African Business Council progress report at: http://www.eabc.info/uploads/progress_report.pdf.

[5]See East African Community (2012), East African Community Secretariat (2011), World Bank (2012), and Dihel et al., (2010).

[6] That model builds on the algebraic structure of the small open economy models of Rutherford and Tarr (2008), Jensen and Tarr (2010; 2012) and of Balistreri, Jensen and Tarr (2011).

[7] Due to lack of data, Burundi, the fifth member of the EAC, is not represented as a separate region of our model.

static model of BTY, we obtain Near Term results. Using projections to 2030 for population and labor force by skill level, we extend the model of BTY to also derive estimated impacts for 2030. We use estimates from the CGE model as inputs in the Global Income Distribution Dynamics (GIDD) microsimulation model to obtain assessments of the changes in the poverty headcount and shared prosperity for each of our simulations. The GIDD is the first global macro-micro simulation tool, which combines a consistent set of price and volume changes from a global CGE model with household surveys at the global level (see Bussolo et al. 2010).

Conceptual innovation is that this paper is the first global trade model to numerically assess the poverty and shared prosperity effects of regional liberalization. It is also the first to examine the poverty and shared prosperity impacts of time in trade costs differentiated by product as well as the impact of liberalization of barriers against foreign direct investors in services.

The essential data problem to assess services commitments has been the lack of estimates of the ad valorem equivalents of the barriers to foreign suppliers of services based on assessments of the regulatory regimes in place. We employ a new database of the ad valorem equivalents of barriers in eleven business services sectors in 103 countries (see Jafari and Tarr, forthcoming), which was aggregated to the sectors and regions of this model (Jafari, 2014c). The estimates of the ad valorem equivalents (AVEs) were possible due to the newly released World Bank survey information on the discriminatory regulatory barriers against foreign suppliers of services on these eleven sectors in 103 countries (see Borchert *et al*., 2014). Many results in the paper depend crucially on this database of AVEs.

In addition, this paper builds on or adapts the following three databases: (i) trade facilitation—the paper employs the database on the time in trade costs of Hummels *et al*., (2007) and Minor (2013). We aggregate the database to the sectors and regions of our model. Although a central finding of the studies by Hummels, Minor and their co-authors is that the AVE of time in trade varies across products, most computable general equilibrium modeling of trade facilitation issues have used a single AVE across all products. We show that this more accurate database impacts the results; (ii) foreign affiliate sales—we use the "Global Database of Foreign Affiliate Sales" developed by Fukui and Lakatos (2012). In the Tripartite region, we augmented the database with independent work; and (iii) estimates of the ad valorem equivalents of non-tariff measures developed by Kee, Nicita and Olarreaga (2009).

At the aggregate level, we find that there are substantial gains for all six of our African regions from deep integration in the Tripartite FTA or comparable unilateral reforms to all countries by the EACU to reduce trade costs; but our decomposition analysis reveals that the estimated gains and the magnitudes vary considerably across countries and depend on the reform. Thus, the regions and countries have very different stakes in the various reforms and would have an interest in negotiating for different reforms in different agreements. One striking finding is that in our Near Term model, we estimate that Kenya gains less from comparable unilateral liberalization by the EACU than from the Tripartite FTA, due in part to an umbrella of protection in services markets in the Tripartite region. For goods markets, Wonnacott and Wonnacott (1981) and Harrison, Rutherford and Tarr (2002) have shown that due to market access, there is the possibility of larger gains in preferential agreements than from unilateral liberalization. This extends their result to services markets.

Karingi and Fekadu (2009), Jensen and Sandry (2011) and Willenbocket (2013) have executed general equilibrium assessments of the impacts of the Tripartite FTA. They focus either exclusively or primarily on preferential tariff reductions.[8] They find small welfare changes from preferential tariff reduction in the Tripartite FTA, with many countries losing and net gains of only about 0.1 to 0.2 percent of GDP. Our estimates of the impact of tariff changes are consistent with these earlier studies; but, depending on the country or region, our estimates of the gains from reductions of trade costs within the Tripartite area are about 10 to 30 times larger than their estimated gains of preferential tariff reduction--suggesting very different stakes.

The paper is organized as follows. In section 2 we provide an overview of the model. In section 3 we explain the data that we have developed or used in constructing this model. The CGE model results are presented in section 4 and the microsimulation results for poverty and shared

[8] Jensen and Sandry add a 2 percent uniform reduction in non-tariff barriers on goods and cross-border services to preferential tariff reduction. Willenbockel also executes a scenario with a five percent reduction in border crossing costs for all goods based on unpublished TradeMark South Africa estimates of border crossing costs; then the estimated gains increase to 0.4 percent of GDP for the Tripartite region in aggregate.

Although they do not focus on Eastern or Southern Africa, two other interesting general equilibrium assessments of trade policy changes in Africa are the following. Anderson, Martin and van der Mensbrugghe (2006) find that global free merchandise trade would boost real incomes in sub-Saharan Africa more than proportionately than in other developing countries; but partial liberalization proposals would capture only a small share of the gains. Mevel and Karangi (2012) analyze the removal of all tariffs on goods within the African continent as a whole. They find this would increase intra-African trade by 52 percent, but if trade facilitation measures are also implemented that reduce the time costs of trade by 50 percent, intra-African trade would more than double.

prosperity are presented in section 5. Sensitivity analysis is presented in section 6. In section 7, we conclude with a summary of the key results and the stakes of the regions of our model based on the reform.

## 2. Overview of the Computable General Equilibrium and Global Income Distribution Dynamics (GIDD) Models

### 2.1 Introduction

In this paper, we obtain results for poverty and shared prosperity in several African countries of deep integration in East and Southern Africa. We do that by first assessing the impacts on the variables that impact poverty and shared prosperity in a computable general equilibrium model. The key variables on which we obtain estimates are the change in the value of real consumption, the change in real wages of skilled and unskilled labor in agriculture and non-agricultural sectors and the change in prices of food and non-food items. We then use those estimates as inputs in the Global Income Distribution Dynamics (GIDD) microsimulation model to obtain assessments of the changes in the poverty headcount and on shared prosperity.

For the near term results, the CGE model employed in this paper is the multi-region trade model developed and explained in Balistreri, Tarr and Yonezawa (forthcoming, *Journal of African Economies*) and in Balistreri, Tarr and Yonezawa (2014).[9] Here we provide a brief overview. For a detailed description, the interested reader is referred to the Balistreri, Tarr and Yonezawa papers for a description of the model and data set of the CGE model. For the long-term results for the year 2030, our model employs exogenous labor force projections and endogenously determines the capital stock for 2030, as explained in section 2.2 below. Otherwise, the long term model for 2030 is the same as the model for the near term.

There are 18 sectors in the model shown in table 1. The mapping from the 57 sectors in the GTAP 8.1 dataset to sectors of our model is explained in appendix A of Balistreri, Tarr and Yonezawa (2014), hereafter BTY. There are three categories of sectors: (1) four perfectly competitive goods and services sectors: (2) seven imperfectly competitive goods sectors; and (3) seven services sectors in which there is imperfect competition and foreign direct investment. The

[9] That model builds on the algebraic structure of the small open economy models of Rutherford and Tarr (2008), Jensen and Tarr (2010; 2012) and of Balistreri, Jensen and Tarr (2011).

cost, production and pricing structures in the three categories differ widely, but regardless of sector, all firms minimize the cost of production.

Primary factors are skilled labor, unskilled labor, capital (including land)[10] and natural resources. Regarding capital, there is mobile capital and sector-specific capital in imperfectly competitive goods sectors and services sectors with FDI; and primary inputs imported by multinational service providers, reflecting specialized management expertise or technology of the firm. There is some sector specific capital for each imperfectly competitive firm (and for firms in services sectors with FDI) for each region of the model. In the sectors where there is sector specific capital, there are decreasing returns to scale in the use of the mobile factors and supply curves in these sectors slope up. We calibrate the elasticity of substitution between sector specific capital and other inputs in each sector so that the elasticity of supply of the firms is consistent with econometric evidence that indicates that the supply response depends on the level of development and the technological complexity of the product. [11] One extension of BTY is that we allow
In BTY, all labor was mobile. Here, in our benchmark equilibrium, we assume that fifty percent of labor is sector specific (both skilled labor and unskilled labor). Value-added is an aggregate of our primary factors with elasticity of substitution $\sigma$. Skilled (and unskilled) labor is an aggregate of sector specific and mobile labor with elasticity of substitution $2\sigma$. Thus, the share of sector specific labor may change in a counterfactual scenario, including a comparative steady state scenario.

**2.2 Comparative Steady State Formulation for the 2030 Solution of the Model.**

The second important extension is, rather than a primary focus on the comparative static model, we provide equal emphasis on the results from a comparative steady state model; and we make some modeling extensions in the comparative steady state model compared with our earlier applications. The comparative steady state model allows us to provide estimates of impacts of the trade policies in 2030.

**2.2.1 Basic Theory of the Endogenous Capital Stock in the Comparative Steady State Model.** In the comparative static model, we assume that the capital stock is fixed and the rental

[10] Given the nature of the shocks we consider (which are economy-wide), we do not believe the aggregation of capital and land has a significant impact on the results.

[11] See Schiff, Wang and Olarreaga (2002) and Schiff and Wang (2006).

rate on capital is endogenously determined. In the comparative steady state model, the logic is reversed: the real return on capital is fixed, but we allow the capital stock to adjust to its steady state equilibrium along with all of the model features we employ in our comparative static model. The comparative steady state model is based on the assumption that investors demand a given rate of return on capital in order to invest in a given country. We assume that the rate of return demanded by investors for each country or region is initially in long run equilibrium. If a trade policy or other type of shock happens to induce and increase in the rate of return on capital so that it exceeds the initial rate of return, investors will invest and expand the capital stock. Expansion of the capital stock drives down the marginal product of capital, i.e., it drives down the rental rate on capital. A new equilibrium in the comparative steady state model is determined when the capital stock rises sufficiently that the real rate of return on capital falls back to the initial level.[12]

To analyze trade policy, this comparative steady state approach has been employed by many authors, including Harrison, Rutherford and Tarr (1996, 1997b) and Baldwin et al. (1999) and Francois et al. (1996). The approach, however, dates back to the 1970s, when both Hansen and Koopmans (1972) and Dantzig and Manne (1974) developed it.

**2.2.2 Endogenous Investment in the Comparative Steady State Model.** We have made an important modification in the modeling approach of the above studies to adjust for a upward bias in the estimated welfare gains. The approach employed in the above studies ignores the foregone consumption necessary to achieve the higher level of investment and, thus, is an upper bound estimate on the long run gains within the framework of the model assumptions. Based on the relationship between the capital stock and the cumulative depreciated value of investment,[13]

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[12] The rate of return on investment in our model is the rental rate on capital divided by the cost of a unit of the capital good. We allow both mobile and sector specific capital to be endogenously determined in the comparative steady state model.

[13] In an intertemporal model, capital is usually measured as the cumulative undepreciated value of investments over time. That is

$$K(t) = K(t-1)d + I(t-1),$$

where **K(t)** and **I(t)** are the capital stock and investment in period t, respectively, and **d** is one minus the depreciation rate. If we assume that investment in each period is constant equal to **I**, then the capital stock in period t is:

$$K(t) = I^*[(1-d^t)/(1-d)]$$

It follows that for a given time period and fixed depreciation rate, the percentage change in the constant value of investment in each period is equal to the percentage change in the capital stock, i.e.,:

$$\Delta K/K = \Delta I/I.$$

we follow Francois *et al*., (2013) and assume that investment increases in proportion to the increase in the capital stock. Since consumers obtain utility only from consumption, if the capital stock increases in our model, investment will increase, thereby reducing the reported welfare gains. This is an adjustment for the upward bias of ignoring the investment costs of increasing the capital stock.

The magnitude (and sign) of the capital stock increase depends on whether the trade policy change favors capital intensive or labor intensive sectors. If the trade policy change favors capital intensive sectors, then the capital stock increase will be larger. If the shock favors labor intensive sectors and the relative return to capital falls sufficiently, it can induce a decline in the capital stock. We have, however, imposed a lower bound of zero on the change in the capital stock in any of our scenarios, assuming that over a fifteen year period it is not reasonable to allow a decline in the capital stock in our regions. If the lower bound constraint is binding, the real return on capital will decline in the new steady state equilibrium.

**2.2.3 Labor Force Projections for 2030.** Projections of the labor force (both skilled and unskilled labor) as well as the total population for 2030 are discussed below. Based on these data, in all of our scenarios for 2030, we shock the benchmark labor force data of the model such that the labor force for the 2030 scenarios in the African regions of the model satisfies two properties: (i) the percentage increase in the total labor force of our model increases by the percentage increase in the total labor force from the projected labor force data; and (ii) regarding the skilled-unskilled labor force mix, the percentage point change in the skilled labor force versus unskilled labor force in our model changes by the percentage point change in the skilled labor force versus unskilled labor force in the projected labor force data. The labor force increase has the impact of increasing the marginal product of capital, so the capital stock also increases in the comparative steady state model.

**2.2.4 Welfare calculation in the Comparative Steady State Model.** An increase in the labor force in a representative consumer model has the impact of increasing output and consumption. But if the population increases, we would expect an approximately proportional decrease in per capita real consumption. To avoid a biased overestimate of the welfare gain in our comparative steady state model with labor force growth, we reduce the welfare gain estimate

(Hicksian equivalent variation) by the percentage increase in the population.14 In many of our African countries the percentage increase in the labor force exceeds the percentage increase in the population. A greater share of the population in the labor force should increase welfare, so we reduce the estimated welfare by the percentage increase in the population, not the percentage increase in the labor force.

### 2.3 Summary of the Global Income Distribution Dynamics (GIDD) model

We use the Global Income Distribution Dynamics (GIDD) model, developed by Bussolo, de Hoyos, and Medvedev (2010), to estimate distributional effects. GIDD is a "top-down" micro simulation framework that exploits heterogeneity observed in household surveys to distribute macroeconomic shocks. These shocks are aligned with a macroeconomic model such as the CGE model used in this paper. More specifically, we impose consistency between the GIDD and the CGE models in this paper in various ways. First, both use the same United Nations projections in aggregate population and age and education structures. The GIDD then uses estimates from the CGE model as inputs into the household model. In particular, as inputs into the calculation of changes in per capita household income, the GIDD uses CGE model estimates of differentiated wages for skilled, unskilled, agricultural and non-agricultural labor and changes in the prices of agricultural and non-agricultural goods.[15]. Finally, all household incomes are adjusted proportionally so that the percentage change in the aggregate of household incomes in the GIDD is consistent with the CGE model's estimate of the percentage change in real income.

GIDD was developed by the World Bank's Development Prospects Group and was inspired by previous efforts involving simulation exercises (Bourguignon et al., 2002; Bourguignon et al., 2008; and Davies 2009). Previous examples of application using CGE outputs and GIDD include the effect of agriculture distortions in the global economy (Dessus, et al., 2008, Bussolo et al., 2010), the effect of demographic change on Africa (Ahmed et al., 2014) and external and internal shocks in Africa (Devarajan et al., 2015).

[14] That is, if EV is our estimated welfare gain in a comparative steady state scenario and the population increase compared with the benchmark is 1.x, then we report a welfare gain equal to EV/1.x.

[15] The aggregate returns to capital and labor in the CGE model, however, are not aligned with the household data. See Rutherford and Tarr (2008) for a discussion of the impact of reconciliation of the factor returns in the household data with the input-output table.

The first step in the microsimulation exercise is to implement a set of changes in the household surveys' demographic structure, as explained in section 3.5. The second step is to adjust factor returns by skill and sector in accordance with the results of the CGE model. The GIDD imposes an entirely new vector of earnings on each worker, conditional on that worker being in sector s and having and educational attainment e. The third step adjusts the average income/consumption per capita to guarantee that it changes exactly in line with the CGE results. Lastly, GIDD constructs a household-specific deflator to adjust for changes in relative prices. The price deflator is constructed using initial and final prices indexes of food versus non-food from the macro model and household-specific budget consumption shares for food and non-food observed in micro data.

Beginning with a distribution of earnings from labor by sector and skill [$y_{s,e}$] in the macro data, define a set of wage gaps as follows:

$$g_{s,e} = \frac{y_{s,e}}{y_{1,1}} - 1 \quad (5)$$

and a similar set of wage gaps for the macroeconomic counterfactual scenario:

$$\hat{g}_{s,e} = \frac{\hat{y}_{s,e}}{\hat{y}_{1,1}} - 1 \quad (6)$$

where $y_{1,1}$ is the average earnings from labor of unskilled workers in agriculture and $\hat{y}_{1,1}$ $and$ $\hat{y}_{s,e}$ are their predicted values from the CGE model in the counterfactual scenario. All right hand side values in equation 5 are known data in the CGE model benchmark dataset, and all right hand side values in equation and 6 are known values in the CGE model simulations.

The micro data will have also have a set of wage premia which, in general, will differ from the CGE data. Analogous to equations 5 and 6, define:

$$g'_{s,e} = \frac{y'_{s,e}}{y'_{1,1}} - 1 \quad (7)$$

$$\hat{g}'_{s,e} = \frac{\hat{y}'_{s,e}}{\hat{y}'_{1,1}} - 1 \quad (8)$$

where $g'_{s,e}$ are the wage premia based on averages by skill group and sector in the household data; $y'_{s,e}$ are the average earnings of labor in sector s and skill group e based on the household data; $y'_{1,1}$ are the average earnings of unskilled labor in agriculture based on the household data; and the "hat" with apostrophe symbols such as $\widehat{g'}$ are the predicted values at the household level as

a result of the policy change. All right hand side values of equation 7 are known from the initial household data. It is necessary to calculate the counterfactual wage gaps $\hat{g}'_{s,e}$. In the GIDD, these will be calculated as:

$$\hat{g}'_{s,e} = g'_{s,e} \frac{\hat{g}_{s,e}}{g_{s,e}} \quad (9).$$

We may calculate the left hand side of equation 9, since the three values on the right hand side are known from equations 5, 6 and 7. Equation 9 implies that even if initial wages differ between the CGE and micro models, the percentage change in the wage gaps will be consistent across the two models. By passing on percent changes in wage premia by type of worker, instead of percent changes in wages, the possibility of wage gaps moving in opposite direction in the macro and in the household data is eliminated. Within each group of workers, distributional changes occur; but, on average, for any group of workers, the relative wages for each type of worker is constrained to be consistent with the corresponding growth rates from the CGE model.

Given the known values in equations 5-9, and defining average wages for unskilled labor in agriculture as numeraire, so that $y'_{1,1} = \hat{y}'_{1,1}$, it is possible to calculate the percentage changes in average wage income of households in sector s and skill level e that are consistent with wage gaps expressed in Equation 9:

$$\hat{y}'_{s,e}/y'_{s,e} \quad (10)$$

Note that Equation 10 only operates on labor income. In order to adjust the micro data such that the weighted average percentage change in the per capita income/consumption across all households matches the change in real consumption per capita in the CGE model, a subsequent adjustment is carried out. Define Y as real per capita income calculated from the CGE model in the benchmark and $\hat{Y}$ as its predicted value in the CGE model simulation. Define $\gamma'_h = \sum_{i \in h} y'_{i,h} / n_h$ as the per capita income of household h in the benchmark equilibrium, where $y'_{i,h}$ is the income of the ith member of household h, and n is equal to the size of household h; similarly, define $\lambda\hat{\gamma}'_h = \sum_{i \in h} \lambda\hat{y}'_{i,h} / n_h$ where $\hat{y}'_{i,h}$ and $\lambda\hat{y}'_{i,h}$ are the unadjusted and adjusted values, respectively, of the income of the ith member of household h in the counterfactual of the micro-model; the role of $\lambda$ is explained immediately below. Then define $Y'$ as the weighted average value of real per capita income across all households, i.e.,

$$\sum_h \nu_h \gamma'_h = Y' \quad (11)$$

where $\nu_h$ is the weight of household h in aggregate income in the benchmark. Correspondingly

$$\sum_h \omega_h \lambda \hat{\gamma}'_h = \hat{Y}' \quad (12)$$

is the weighted average per capita income value in the policy simulation. Note that $\sum_h \upsilon_h = 1$, $\sum_h \omega_h = 1$ and $\lambda$ is a scalar. Equations 11 and 12 allow for different household weights since the weights of the households will typically change over time. So that the percentage change in the aggregate value of household income is consistent with the CGE model, we constrain $\hat{Y}'$ by equation 13:

$$\hat{Y}' = Y' \frac{\hat{Y}}{Y} \quad (13)$$

We implement this constraint in a distribution neutral way. That is, we adjust all household income in the counterfactual by a scalar $\lambda$ such that per capita household income equals $\lambda \hat{\gamma}'_h$: as a result, $\lambda$ can be defined by:

$$\lambda \sum_h \omega_h \hat{\gamma}'_h = Y' \frac{\hat{Y}}{Y} \quad (14)$$

Despite the fact that the GIDD ignores other forms of income, such as capital income, this transformation guarantees consistency between the weighted average household income assessment and the CGE model assessment. For poor households, which is the main focus of our work, the assumption should be reasonably accurate, since poor households have little capital income. There is more of a margin of error for wealthier households. But for these households, it is skilled labor rather than unskilled labor that tends to be more important and Bussolo, de Hoyos, Medvedev (2010) have noted a tendency for skilled wage and returns to capital to be correlated.

Finally, macroeconomic estimates of changes in agricultural and non-agricultural prices are distributed across heterogeneous households using the following method. Let us define the initial per capita monetary income of household h, $\gamma'_h$, and the purchasing power of household h, $\gamma^r_h$, as the ratio of its monetary income divided by a household-specific price index capturing the household's consumption patterns in terms of food and non-food expenditure:

$$Y_h^r = \frac{\gamma_h'}{P_h} = \frac{\gamma_h'}{\alpha_h P_f + (1-\alpha_h)P_{nf}} \qquad (15)$$

where $P_f$ and $P_{nf}$ are food and non-food price indices and $\alpha_h$ is the proportion of household's h budget spent on food. Equation 15 captures the dual effect of a price variation, i.e. higher monetary income on the one hand, and the loss of purchasing power on the other.

The $\alpha_h$ parameter in the denominator of the right hand side of Equation 15 can be estimated with household data using the following specification:

$$\alpha_h = \beta_0 + \beta_1 \ln(\gamma_h') + e_h \qquad (16)$$

where $e_h$ is a vector of household-specific errors that are assumed to be distributed with $E(e_h) = 0$ and $V(e_h) = \sigma^2$. Assuming that estimated parameters $\hat{\beta}_0$ and $\hat{\beta}_1$ remain constant, the new budget share spent on food for household h, $\alpha_h'$, at the counterfactual per capita income, $\lambda\hat{\gamma}_h'$, can obtained from:

$$\alpha_h' = \hat{\beta}_0 + \hat{\beta}_1 \ln(\lambda\hat{\gamma}_h') + \hat{e}_h \quad (17)$$

The changes in real per capita incomes brought about by a change in relative prices of food versus non-food can be approximated by the following linear expression:

$$\hat{\gamma}_h^r = \frac{\lambda\hat{\gamma}_h'}{\alpha_h' P_f' + (1-\alpha_h')P_{nf}'} \qquad (18)$$

were $\hat{\gamma}_h^r$ in Equation 17 is the real per capita income adjusted for changes in relative prices of food versus non-food . $\hat{\gamma}_h^r$ is the counterfactual measure of real per capita income of household h for the analysis of poverty and shared prosperity.

## 3. Estimates of the Ad Valorem Equivalents of the Trade Costs, Population Projections and Foreign Direct Investment Shares

Given the primary importance of the ad valorem equivalents of the barriers against foreign suppliers of services, the time in trade costs and the non-tariff barriers, we discuss those estimates here and present the estimates in tables 2a-2f. Since it involves a new dataset, we also discuss the estimates of the shares of domestic services markets captured by foreign direct investors. Full documentation of the data set is available in BTY. Finally, given their importance for our 2030

CGE model and the microsimulation work, we also discuss the population and skill mix projections.

### 3.1 Ad Valorem Equivalents (AVEs) of the Barriers Against Foreign Suppliers of Business Services.

Our estimates in the services sectors necessitated the development of a new global database of the ad valorem equivalents of discriminatory barriers against foreign providers of services. This was possible only because of the availability of a new World Bank database of survey information on the discriminatory regulatory barriers in 11 services sectors in 103 countries described in Borchert, Gootiiz and Mattoo (2014).[16] Borchert et al., produced "Services Trade Restrictiveness Indices," but did not transform their indices of the regulatory regimes into ad valorem equivalents. Our methodology uses the World Bank database for an assessment of the regulatory regimes, but builds on a series of studies, supported by the Australian Productivity Commission, to convert assessments of services regulatory regimes into ad valorem equivalents for all 11 sectors in 103 countries. This work is documented in Jafari and Tarr (forthcoming). The aggregation to the sectors and regions of our model is documented in Jafari (2014c). In the cases of Kenya and Tanzania, additional information was available and the estimates are taken from Jafari (2014a) and Jafari(2014b).

### 3.2 Estimates of the Ad Valorem Equivalents of the Costs of Time in Exporting and Importing.

In order to estimate the impact of improved trade facilitation, in this paper we apply a new dataset of the time cost of trade based on the path-breaking work of Hummels and Schaur (2013) and Hummels et al., (2007). Using the estimates of Hummels and his co-authors, Peter Minor (2013) provided estimates for the regions and products in the GTAP database on a bilateral basis. We use estimates from Peter Minor, which we aggregate to the sectors and regions of our model, yielding the cost of trade by product and country on a bilateral trade basis. Detailed documentation of the steps we have taken, and a brief explanation of the methodology may be found in appendix C of BTY.

[16] In the cases of Kenya and Tanzania, we commissioned new surveys by local law firms of the regulatory regimes in services as a basis of estimating both the non-discriminatory barriers that impact both domestic and foreign suppliers of services as well as the discriminatory regulatory barriers against foreign suppliers of services. See Jafari (2014a; and 2014b).

### 3.3 Estimates of the Ad Valorem Equivalents (AVEs) for Non-Tariff Measures (NTMs) for the Regions of our Model

Our estimates of the AVEs of NTMs are based on the estimates of Kee *et al*., (2009). Building on Kee *et al*., (2008), Kee *et al*., (2009) estimate the AVEs of NTMs for 105 countries at the 6 digit level. These estimates, as well as aggregated estimates for manufacturing and agriculture for the 105 countries, are available on the World Bank website.[17] An alternate choice of NTM estimates is Cadot and Gourdon (2014). Although the Kee *et al*. estimates should be updated, we choose the Kee *et al*. dataset due to its acceptance in the literature and the need to have non-negative estimates of the AVEs.

The measure we use from Kee *et al*. is the uniform tariff equivalent that generates the same level of import value for the country in a given year, based on applied tariffs, which take into account bilateral trade preferences.[18] At the six digit level, the estimates of Kee *et al*. are sometimes subject to a substantial margin of error that may lead to misleading results in a CGE model policy analysis. Consequently, we have chosen to use the aggregated estimates of Kee *et al*. at the sector level, i.e., for each country, we have two AVEs for each country: one AVE of the NTMs in manufacturing and one AVE of the NTMs in agriculture. We then further aggregate these values for 93 countries to the regions of our model. Details are available in appendix B of BTY. Where the non-tariff measure has a regulatory function, we assume that the estimate of Kee *et al.* is the discriminatory component of the regulation.

Although the benchmark equilibrium incorporates tariff free trade between partners in free trade agreements or customs unions, the report of the East African Community (2012) shows that non-tariff barriers remain a very significant problem. Consequently, we assume the ad valorem equivalents of the non-tariff barriers apply to all countries.

### 3.4 Share of Market Captured by Foreign Direct Investors in Services and by Cross-Border Sales of Services

For each country or region in our model, it was necessary to calculate the market share of foreign direct investors by source region in the business services sectors of our model as well as

[17] The dataset is available at: http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:22574446~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html.

[18] Specifically, we take the difference between the Overall Trade Restrictiveness Index (OTRI) and for the Tariff-only OTRI (OTRI_T), which gives us the AVE of the NTMs.

the share of cross border services in each of our regions for these seven sectors. For cross-border sales of services, we use the trade data from the GTAP 8.1 dataset.

Our primary data source for foreign affiliate sales is the database developed by Fukui and Lakatos (2012). Fukui and Lakatos combine Eurostat data for 41 countries with an econometric model to estimate the missing values and thus produce estimates for all regions and sectors in the GTAP dataset. For the share of sales in the sector by the host country, we use the GTAP dataset for total sales in the sector and subtract the total of foreign affiliate sales from total sales to obtain the host country share of sales. In the case of insurance services in African regions, we used the Axco database (for a complete list of companies) and publicly available information on ownership shares of companies as our primary data sources. In the case of telecommunications services in our six African regions, we used national communications commission data and other publicly available sources on ownership of companies, taking South Africa as our proxy for SADC. Details are in appendices D and E of BTY. In Kenya and Tanzania, professional associations of lawyers and engineers in these countries provided data on the number of professionals, both total and non-local. Details and documentation of the calculations for Kenya and Tanzania are available in Jafari (2014d).

### 3.5 Population and Skill Mix of the Labor Force

The population growth adjustment is particularly important in countries with high fertility rates, such as those in Sub-Saharan African. In practical terms, the adjustment for population growth allows the analysis to explicitly take into account changes in the size of the working-age population. We perform population and education projections during the first stage of the micro-simulation model and in creating the Business as Usual scenario for the comparative steady state CGE model. For each country, we construct the demographic profile in two steps. First, the age and gender composition is exogenously determined following medium variant estimates from the World Population Prospects (United Nations Department of Economic and Social Affairs, 2015). In a second step, following Bourguignon and Bussolo (2012), country-specific educational profiles are constructed using initial educational achievement levels observed in the household surveys with some conservative yet simple assumptions about educational progress.

More specifically, starting with the household surveys, the country specific demographic profiles are constructed by partitioning each country's total population into: (1) 16 age-groups (0-4, 5-9, 10-14, …, 65-69, 70-74, 75; (2) two gender groups; and (3) three different levels of

educational attainment: (i) No-education or primary; (ii) secondary; and (iii) tertiary education. As mentioned earlier, we employ age and gender totals based on data from the United Nations' (2015) medium variant population projections. In terms of education, we assume that as the population ages, the average educational attainment in a country increases through a pure pipeline effect, as younger and more educated cohorts replace older cohorts. For example, if at time *t* half of the population in the cohort formed by individuals between 25 and 30 years of age have post-secondary education, then after ten years (at *t*+10), half of the population between 35 and 40 will have post-secondary education. Furthermore, for younger cohorts we imposed the assumption that there is no improvement in enrollment and graduation rates from those observed at time *t*. In other words, the average educational attainment of these young cohorts in the future is equal to the average educational levels of the 20 to 24 cohort of time *t*. This is a conservative assumption given that the 20 to 24 cohort observed at time t may not have the maximum educational level attainable[19].

## 4. CGE Results: Deep Integration in Eastern and Southern Africa

We present both "Near-Term" results in table 3 and results for 2030 in table 4. Our Near Term results are from our comparative static model. The results for 2030 are from our comparative steady state model. We present results for the change in the real value of consumption (or welfare)[20] and all other variables that are the necessary inputs into the GIDD analysis of poverty and shared prosperity.

It is useful to provide some clarification of the estimates of the change in the real value of personal consumption. All results of changes in the real value of personal consumption are estimated **annual gains;** importantly, these annual gains accrue every year. Thus, if x is gain in real income (measured by the Hicksian equivalent variation) as a percent of consumption for one year, the present value of the gains into the infinite future are the equal to x*[(1+ d)/d], where d is the discount rate for future gains. For example, with d = 7 percent, the present value of the gains would equal 15 times the values presented in table 3.

[19] In practical terms, the micro-simulation model recalibrates each household sample weight to match the age, gender, and education projected totals. A new probability distribution can be obtained by solving an optimization problem based on a minimum cross-entropy criterion as in Olivieri et. al. (2014). The minimum cross-entropy method assures that the new sets of age, gender and education, deviates as little as possible from the initial distributions. See Wittenberg (2010) for a technical description and implementation of this method.

[20] The welfare gains are calculated from Hicksian equivalent variation as a percent of consumption;

For the 2030 results, the first column of table 4 displays results for the "Business as Usual" (BAU) scenario. The BAU scenario includes an exogenous increase in the labor force categories and an endogenous determination of the capital stock, as discussed in section 2.2. BAU excludes trade policy changes. The scenarios for trade policy impacts for 2030 are presented as differences from the BAU scenario, and thereby are the trade policy impacts alone, excluding the impact of the labor market expansion. There is an endogenous capital stock change in the trade policy scenarios for 2030, but it is attributable to the impact on the real return to capital from the trade policy change. The gains from the trade policy changes in the 2030 model are typically larger in the steady state 2030 scenario than in the near term comparative static model. The reason is that the trade policy shock increases incomes and usually (but not necessarily) increases the capital stock. Despite the reduction in real consumption due to the increase in investment, the larger capital stock in 2030 leads to larger gains in real incomes.

As discussed in section 2.2, The magnitude (and sign) of the capital stock increase depends on whether the trade policy change favors capital intensive or labor intensive sectors. If the trade policy change favors capital intensive sectors, then the capital stock increase will be larger. Since the capital stocks for the different countries and regions grow at different rates due to the trade policy changes, the estimated increases in the gains in the 2030 scenario relative to the near term scenario differ across countries and regions.[21]

As a point of reference to compare with the Tripartite FTA, we first consider what is at stake for the EACU members from narrower deep integration within the EACU alone and wider unilateral liberalization. As members of a customs union, we assume that the EACU members act collectively on all actions in our scenarios. In our benchmark equilibrium we assume that tariff free trade prevails within each of the three regional groups of the Tripartite area, but the barriers that lead to high trade costs apply to all countries and regions. In tables 2a-f, we show the benchmark ad valorem rates of distortion for all barriers we apply in the six African regions of our model.

[21] For example, Kenya and Tanzania are both estimated to gain 0.96 percent of consumption from the EACU central scenario in the near term (table 3). But the same trade policy changes in the 2030 model result in Kenya gaining 3.78 percent of consumption, while Tanzania gains only 1.76 of consumption.

### 4.1 Deep Preferential Integration within the East African Community ("EAC Central")

**4.1.1 Scenario Definition.** We execute several scenarios in our multi-region trade model to assess the impacts of the reduction in trade costs by Kenya, Tanzania, Uganda and Rwanda as members of the East African Customs Union. We include a reduction of the ad valorem equivalents of three types of trade costs: time costs of trade (trade facilitation); non-tariff barriers; and barriers against foreign suppliers of services. The specifics and rationale are as follows (see also table 3).

**Trade Facilitation: we assume a 20 percent cut in the ad valorem equivalents of the time cost of trade within the EAC; and a five percent cut in these costs for trade with countries outside of the EAC.** We take modest cuts in these barriers for multiple reasons. One reason is that the most efficient countries in the world have positive time costs of trade. Second, part of the costs are due to infrastructure deficiencies that cannot be addressed through policy alone. There are, however, some collaborative projects and plans among members of the EACU (see East African Community Secretariat, 2011), such as common customs posts, designed to cut the time costs of trade. Since there is likely a spillover benefit of these measures within the EACU that will cut the time costs of trade outside of the EAC, we assume cuts in external trade costs as well.

**Non-Tariff Barriers: we assume a modest 20 percent cut in the ad valorem equivalent of the non-tariff measures.** Under the auspices of the East African Community, the member countries are undertaking collaborative efforts to reduce non-tariff barriers (see, for example, East African Community, 2012). Non-tariff measures, however, have become much more subtle in the post-Uruguay Round world. Most measures have a legitimate regulatory function and distinguishing the legitimate regulations from protective or inefficient regulations is complicated. We elaborate in section 6.3 on an approach to reduce these barriers. Consequently, we take a more modest 20 percent reduction in the ad valorem equivalent of these barriers, with no spillover to countries excluded from the agreement.

**Barriers on foreign providers of services: We take a fifty percent cut in these barriers.** On July 1, 2010, the East African Community adopted a Common Market protocol that called for

the free movement of services within the five member states, along with the free movement of goods, capital and labor.[22]

**4.1.2 Aggregate Welfare Effects of Deep Preferential Integration by the East African Customs Union.** Our near term aggregate results for Kenya, Tanzania, Uganda and Rwanda are presented in table 3. We present **r**esults for 2030 in table 4. We first describe the near term results.

**Near Term Results.** Under the column labeled "EAC Central," we report our findings for the impacts of combined cuts in trade facilitation, non-tariff barriers and services barriers. The welfare gains are presented as Hicksian equivalent variation as a percent of consumption. We find that all four EACU countries gain from this deep integration, with gains ranging from a low of 0.9 percent of consumption in the case of Tanzania to a high of 1.4 percent of consumption in the case of Rwanda. The welfare impact on COMESA and SADC of deep integration within EACU is imperceptible. To examine the source of these gains in the EAC, we execute three additional scenarios in which we allow only one of the reforms to be implemented in each case.

**Results for 2030.** The results for the 2030 are presented in table 4. Real income gains in the BAU scenario are substantial, ranging from 17 percent for Rwanda to 45 percent for Kenya and SADC. The large gains are due to two factors: the labor force is projected to grow faster than the population and the capital stock increases.

Typically, the gains from the trade policy changes are magnified in the 2030 model compared to the near term model. For the EACU scenario, Kenya experiences the largest proportional increase in real consumption gains, as the trade policy changes favor its capital intensive sectors. Uganda on the other hand, gains less in the 2030 EACU scenario than the near term since the expansion significantly favors its agriculture sector, which is the least capital intensive in the Ugandan economy.

**4.1.3 Preferential Reduction of Time in Trade Costs by EAC.**

In the case of deep preferential integration within the East African Community (EAC), the reduction in time in trade costs constitute the largest share of the gains in both the Near Term and the 2030 scenarios. In the Near Term, reduction in time in trade costs accounts for about two-thirds of the total gains in the cases of Kenya and Tanzania, but over 80 percent of the gains in the cases

[22] For the text of the protocol, see: http://www.eac.int/commonmarket/index.php. See also Dihel, Fernandes, Mattoo and Strychacz (2010) for a discussion of liberalization of professional services in East Africa.

of Uganda and Rwanda. In all scenarios shown in table 3, we assume that all three types of trade barriers consume capital and labor in the home country. For example, reduction of the time in trade costs by 20 percent within the EACU and by 5 percent for countries outside the EAC, leads to freeing up of 20 percent of the capital and labor devoted to overcoming the time costs of trade within the EACU on both imports and exports and five percent of the capital and labor devoted to overcoming the time costs of trade outside the EACU on both imports and exports. To help interpret the results, we have calculated the value of the rents recaptured by any of the policies simulated (see table 9 of BTY). In the case of improved trade facilitation in the EAC, rents recaptured as a percent of domestic consumption are 0.37 percent in Kenya and 0.41 percent in Tanzania. These are "rectangles" of gains. The reduction of the costs of trade results in an increase in the returns to exporting relative to domestic sales and a decrease in the cost of imports relative to domestic production. As a result, there are also "triangles" of efficiency gains from increased trade. Aggregate trade increases in all four EACU countries, ranging from 2.7 percent in Tanzania to 8.8 percent in Rwanda. Rents as a share of the total welfare gain range from 50 percent in the case of Uganda to about 83 percent in the case of Rwanda.

**4.1.4 Reduction of Non-Tariff Barriers within the EAC**. For Tanzania and Kenya, in both the Near Term and 2030 scenarios, the next most important source of gains is the reduction of non-tariff barriers within EACU by 20 percent. In the Near Term (2030) scenario, Hicksian equivalent variation increases by 0.1 (0.9) percent in the case of Kenya and 0.17 (0.37) percent in the case of Tanzania. Unlike improved trade facilitation, in this scenario non-tariff barriers only result in captured rents on the import value and only on EACU partner country imports. There are substantially fewer rents affected by the reduction of non-tariff barriers, compared with trade facilitation. Recaptured rents are equal to .016 percent of consumption for Kenya and 0.218 percent of consumption in the case of Tanzania. Since the non-tariff barriers are lower in Uganda and Rwanda, the welfare gains are only .04 and .03 percent of consumption, respectively in the Near Term. Analogous to the reduction in trade costs, the reduction of the non-tariff barriers results in a decrease in the cost of imports relative to domestic production. As a result, there are also "triangles" of efficiency gains from increased trade. Trade increases in all four countries, with the maximum increase of 1.8 percent in Tanzania in the Near Term.

**4.1.5 Preferential Reduction of Barriers against EACU Service Providers.** In the Near Term (2030) scenario, fifty percent preferential liberalization of services barriers results in gains

of .04 (0.23) percent of consumption in the case of Kenya and .03 (0.03) percent of consumption in the case of Tanzania. Only in the case of Rwanda within the EACU and Uganda in the 2030 scenario are the gains from services liberalization greater than reduction of non-tariff barriers. As with other trade costs, in our central scenario we assume that it takes domestic capital and labor to overcome the costs of the barriers against foreign providers of services, both those that supply the domestic markets through FDI and also through cross-border services. Thus, there are potentially rectangles of recaptured rents from reducing the barriers on EACU foreign suppliers of services in other EACU markets. We say potential, since if there are no sales of services from partner countries initially, there are no rents to be recaptured. We calculate that the recaptured rents on FDI and the recaptured rents on cross-border sales of in services. The recaptured rents on FDI from partner countries in the EACU are equal to .026 percent of consumption in the case of Kenya and .006 of consumption in the case of Tanzania. There are very small flows of cross-border trade in our business services within EAC, however, so only Rwanda has a positive rent rectangle, when measured at three digits. With the reduction in the barriers on EACU suppliers of services within EAC, there are production and consumption efficiency gains, which explain the difference between the total welfare gains and the recaptured rents.

### 4.2 EACU Unilateral Liberalization ("EAC Liberal")

The above estimates indicate that there are gains from deep integration within the EAC. With a combined nominal GDP in 2013 of only about US$121 billion (or US$297 on a purchasing power parity basis),[23] however, the EACU is not a large market, and economic theory indicates that there should be substantially greater gains from integrating into the world trading environment. As a point of reference, in the scenario labeled "EAC Liberal," we assess the extent of these larger gains from unilateral extension by the EACU of the reforms to lower trade costs.

**4.2.1 Scenario Definition.** In EACU Liberal, we extend the liberalizations of non-tariff barrier and services barriers implemented in "EACU Central" to all trading partners in the world. In the case of the time in trade costs, we assume the EACU countries implement equivalent reforms to those in the EACU Deep Integration scenario to reduce the time in trade; but we do not extend

[23] In 2013, the International Monetary Fund estimated the nominal GDP of the EACU members as follows (in billions of US dollars): Kenya, 55; Tanzania, 33.3; Uganda, 22.9; Rwanda, 7.4; and Burundi, 2.7. The purchasing power parity GDP, however, was estimated by the IMF at: Kenya, 125.8; Tanzania, 84.9; Uganda, 61.9; Rwanda, 17.4; and Burundi, 7.9.

these outside of the EACU on the grounds that the improvements that can be made are primarily regional and reciprocal and we already convey a five percent cut in these barriers for countries outside of the EAC. In tables 3 and 4, the results and policy changes are listed.

In the Near Term scenario, we see that for Kenya and Uganda, the gains are about twice as large as in EACU Central; for Rwanda the gains increase substantially from 1.4 percent to 4.95 percent of consumption. The biggest increase in welfare is for Tanzania; the welfare gain dramatically increases from 0.95 percent of consumption to 7.11 percent of consumption. We decompose the EACU Liberal scenario to explain the differences across the EACU countries.

In the case of Tanzania, the big increase in welfare is clearly due to the broader liberalization of non-tariff barriers. The wider liberalization of non-tariff barriers results in a welfare gain of more than five percent of consumption, whereas the welfare gains were only 0.17 percent of consumption in the EACU Central case. This large increase is explained by two factors: (i) as shown in table 2, the ad valorem equivalents of the non-tariff barriers in Tanzania are 47.4 percent in manufacturing and 22.2 percent in agriculture. This is substantially higher than the estimates for the other African countries or regions in our model; and (ii) on a trade-weighted basis, 84.7 percent of Tanzania's trade is with countries outside of the EAC. Thus, the reduction of NTB barriers impacts a much larger share of trade, generating more recaptured rents and greater efficiency gains.

The other country in EACU to see much larger gains is Rwanda, but in the case of Rwanda it is due to wider services liberalization. For Rwanda, the ad valorem equivalents of the non-tariff barriers are less than five percent, so the gains from NTB liberalization are much smaller than in Tanzania. But the ad valorem equivalents of barriers to foreign service providers are substantial, with four sectors having AVEs of between 25 and 62 percent. Our dataset on foreign share of services markets (see table 6d of BTY) shows that the market share of EACU services firms in Rwanda is zero except for Kenyan insurance firms; but there is substantial foreign presence in Rwandan services from the EU, US and ROW (with SADC having a presence in the Rwandan telecommunications and insurance sectors); so the broader liberalization has a much larger impact.

In the 2030 EACU Liberal scenario, the gains for Tanzania, Uganda and Rwanda all increase substantially relative to the 2030 EACU Central scenario, by 5.5, 6.4 and 5.2 times, respectively. The estimated gains for the four members of the EACU in our model are all substantial, ranging from 6.5 to 11.1 percent of consumption, annually.

### 4.3 The Tripartite Free Trade Area

**4.3.1 Scenario Definition.** The Second Tripartite Summit in June 2011 envisioned liberalization of trade in goods and movement of business persons in Phase I and, in Phase II, liberalization of trade in services and related trade areas. Programs of trade and transport facilitation and NTB removal have been launched.[24]

In our Tripartite preferential liberalization scenario, we assume all six of our Tripartite-African regions (Kenya, Tanzania, Rwanda, Uganda, COMESA and SADC) execute identical preferential liberalization of the time costs of trade, non-tariff barriers and services liberalization as we implemented in the EACU Central scenario, except that the preferences apply throughout the Tripartite region.. In order to assess the relative importance of each of the three components of the Tripartite scenario, we execute three additional scenarios, where each of the three trade costs components is liberalized separately. The specific policy changes and results are summarized in tables 3 and 4.

**4.3.2 Aggregate Welfare Results.** For all four EACU countries, the aggregate welfare gains from deep integration in the Tripartite area are larger than deep integration within the EACU alone. In the Near Term scenario, the estimated gains range from 2.3 percent of consumption for Tanzania to 3.1 percent of consumption for Kenya. In the 2030 scenario, the estimated gains range from 3.4 percent of consumption for Rwanda to 7.5 percent of consumption for Kenya. Gains for COMESA and SADC while substantial, are significantly smaller than for the EACU countries, at 1.5 and 0.8 percent of consumption, respectively in the Near Term and 2.4 and 1.6 percent of consumption in the 2030 scenario. While in both the Near Term and 2030 scenarios the gains for Rwanda and Tanzania fall considerably relative to EACU Liberal (or unilateral), interestingly, in the case of Kenya in the Near Term, the gains are larger in the Tripartite FTA than in "EAC liberal." These results provide a partial rationale for why the Kenyan authorities are among the strongest supporters of Tripartite deep integration. We conduct decomposition analysis to determine the reasons for these differences.

**4.3.3 Trade Facilitation Only Results**

The "only trade facilitation" scenario shows that a significant part of the explanation for the larger gains for the EACU countries in the Tripartite FTA is the greater reduction in the time

[24] See Pearson (2012) and Willenbockel (2013) for details.

costs of trade. Since the larger reductions in the AVE of the time costs of trade extend to COMESA and SADC, there are additional captured rents and efficiency gains from the widening of the trade facilitation reforms. The simulation results reveal two aspects of the gains from trade facilitation that are not obvious.

First, for the COMESA and SADC regions, we can see that despite the fact that the reduction in the time costs of trade is an important contributor to the gains, the gains for COMESA and SADC (of 0.3 percent and 0.6 percent of consumption, respectively in the Near Term and 0.3 percent and 1.0 percent of consumption, respectively in the 2030 scenario) are considerably less than for the four EACU countries. The reason is that the COMESA and SADC regions trade much more intensively with countries outside of the Tripartite region, where we assume there are fewer opportunities for reductions in time in trade costs. The trade-weighted import intensities of goods trade with regions outside of the Tripartite region are as follows: Kenya, 86.7%; Tanzania, 84.7%; Uganda, 70.7%; Rwanda, 63.1%; COMESA, 97.6%; and SADC, 99.3%.

Second, despite wider liberalization in the EACU Liberal scenario, the trade facilitation gains for the EACU countries are larger in the Tripartite scenario than they are in the EACU Liberal scenario (in both the 2030 and Near Term scenarios). This is because of our assumption that the trade facilitation reforms, such as road and border crossing improvements, disproportionately reduce the costs of the local countries implementing the reforms. Our Tripartite scenario widens the regions to which the larger 20 percent cuts apply, but the EACU Liberal scenario applies a five percent cut in these costs on trade outside of the EACU. This is part of the explanation for Kenya gaining more in the Tripartite scenario than in EACU Liberal in the Near Term.

**4.3.4 Services Liberalization within the Tripartite FTA.** In the case of preferential liberalization of services alone, in both the Near Term and 2030 scenarios, the gains for the EACU countries are slightly larger than EACU alone, but very significantly reduced compared with widening the service market opening embodied in the EACU Liberal scenario (Kenya in the Near Term scenario is an important exception, as discussed below). This is due to the relatively low market shares of partner countries in the services sectors of the Tripartite countries. The Rwanda case is the most extreme. For Rwanda, the gains from services liberalization in the 2030 (Near Term) scenario increase from 0.48 (0.22) percent of consumption under the Tripartite scenario to 8.4 (3.35) percent of consumption under EACU Liberal. As explained above, the ad valorem

equivalents of discriminatory barriers to foreign service providers are substantial in Rwanda. But the main foreign service suppliers in Rwanda's are European Union suppliers followed by the United States and Rest of the World. COMESA's share in Rwanda's service markets is zero and SADC is represented in Rwanda only in telecommunications (36 percent) and insurance (4 percent). So liberalization of services markets by Rwanda in the Tripartite FTA yields additional services suppliers and gains from COMESA and SADC only in telecommunications and insurance.

Two regions gain substantially from services liberalization within the Tripartite FTA. One is Kenya, which, possibly surprisingly, gains more in the Near Term Tripartite "only services liberalization" scenario than in the EACU Liberal "only services liberalization" scenario (1.39 versus 0.98 percent of consumption). The reason is that Kenya has a significant share of the insurance markets in COMESA, where we estimate a very high ad valorem equivalent of the barriers to services providers (prices about double estimated unconstrained prices). The improved market access for Kenyan insurance suppliers under the protected umbrella of very high barriers creates substantial gains for insurance services suppliers from Kenya in COMESA markets. We verified this explanation by executing a scenario in which we preferentially liberalize services barriers within the Tripartite area, but exclude preferential reduction in insurance services barriers. In this scenario, the estimated Near Term gains to Kenya from "only services liberalization" within Tripartite fall dramatically from 1.39 to 0.2 percent of consumption. The theory paper of Wonnacott and Wonnacott (1981) emphasized that improved market access in export markets of goods could lead to preferential trade agreements dominating unilateral trade liberalization; and this was demonstrated by Harrison, Rutherford and Tarr (2002) for goods. Our result for Kenya extends those earlier results in goods to market access in services, and shows that preferential agreements can yield larger gains than unilateral liberalization due to market access gains.

The other region that reaps substantial gains from services reform in the Tripartite area is COMESA. This is explained by the high services barriers in COMESA, especially in insurance, yielding large rent capture from liberalization, and efficiency gains from better access to relatively efficient services suppliers.

**4.3.5 NTB Liberalization.** The key result is that the EACU countries have a lot more to gain from NTB liberalization in the Tripartite FTA than does COMESA or SADC. For Uganda and Kenya in the Near Term and Kenya in the 2030 scenario, possibly surprisingly, they gain more from preferential NTB liberalization in the Tripartite FTA than from equivalent unilateral

liberalization of EACU Liberal scenario. Similar to Kenya in services liberalization, improved market access in goods is the explanation. Uganda's (Kenya's) AVEs of NTBs are estimated to be a 3.9 (14.6) percent in agriculture and zero (0.3 percent) in goods. So that explains the low gains for Kenya and even lower for Uganda from unilateral liberalization in EACU Liberal. But the EACU countries obtain preferential market access in COMESA (which has AVEs of agricultural and manufacturing NTBs of 27.5 and 20.1 percent, respectively) and SADC, with 4.5 percent AVEs of agricultural NTBs. On the other hand, for Tanzania, since 84.7 percent of Tanzanian goods trade is with countries outside of Eastern and Southern Africa and they have the highest AVEs of NTBs among our regions (see table 2b), the gains under EACU Liberal from NTB liberalization are about eight times larger than under the Tripartite FTA in the Near Term and about 5.7 times larger in the 2030 scenario.

For COMESA and SADC, the gains are negligible from a cut in the AVEs of the NTBs. This is because only 2.4 percent for COMESA and 0.7 percent for SADC of their trade is with each other or the EACU countries.

**4.3.6. Sector Impacts: Diverse Impacts of Trade Facilitation.** Previous efforts at simulating sector output and export changes from trade facilitation used uniform ad valorem equivalents across sectors, which led to more uniform impacts across sectors. Our dataset has the time costs of trade varying by both product and by country or origin and destination, [25] which yields more diverse estimates of the impacts on output and exports of trade facilitation. The dataset is especially important in explaining results for Uganda. One of the Ugandan sectors with the highest AVE of the time costs of exporting (importing) is agricultural products, where the Ugandan AVE is about 40 (30) percent, depending on the destination (origin) country.[26] Consequently, from trade facilitation, we estimate an expansion of agricultural output and exports in Uganda relative to other sectors in Uganda (see BTY for sector output and export changes in all regions of our Near Term model). The reduction of time costs of trade on agricultural exports, allows Uganda to more effectively capitalize on the improved market access opportunities presented by the preferential market access in SADC afforded by the Tripartite FTA.

### 4.4 Adjustment Costs and the Political Economy of Regional Trade Liberalization

[25] Due to the product mix differences across countries of the aggregated sectors of our model.

[26] The partner country AVE is also relevant in assessing impacts.

We find that, in general, preferential trade liberalization (tariff or NTB reduction) results in substantially muted output changes at the sector level compared with unilateral liberalization. Take Tanzania as an example (which has the highest AVEs of its NTBs in our dataset). In the Near Term model, the gains from unilateral reduction of NTB barriers alone are about 25 times greater than the gains from liberalization within EACU alone. But, the maximum output decline at the sector level from NTB liberalization within EACU alone is two percent, but with unilateral liberalization, we estimate output declines of 9.5 percent for textiles and apparel, 11.8 percent for other manufacturing and 13.8 percent for wood and paper products. Thus, although the welfare gains of preferential liberalization are dramatically smaller than unilateral liberalization, the adjustment costs are also smaller.

To illustrate, we quantify the adjustment costs estimate for Tanzania, by adopting the unemployed resources measure of the social costs of adjustment of a trade policy change.[27] Let w = the annual wage rate; L = the total labor force; ΔL = the number of workers who are displaced by the trade policy change; β = ΔL/L = the share of the labor force that is displaced by the trade policy change; μ = the share of one year that a displaced worker is unemployed; and X = the loss of output due to the displacement of ΔL workers. Then, if $\frac{\partial Y}{\partial L}$, the marginal product of labor, is equal to wages, we have that X is given by equation (3)

$$\frac{\partial Y}{\partial L} * \Delta L * \mu = w*\Delta L * \mu = X \quad (3)$$

Tanzanian national statistics indicate that labor receives 60.4 percent of GDP.[28] Then w = .604*GDP/L; substituting for w in (3) and dividing by GDP, we have that the social costs of adjustment as a share of GDP are shown by equation 4:

$$\mathbf{.604 * \beta * \mu = X/GDP} \quad \textbf{(4)}.$$

We calculate equation 4 for Tanzania for our three principal scenarios. Regarding β, in our Near Term model simulations, we estimate the number of workers that must change jobs by sector and skill type. Taking a weighted average across all sectors and skill types of labor for Tanzania, we calculate that: β = 0.0049 for the EACU Central scenario; β = .0117 for the EACU Liberal scenario; and β = .0146 for the Tripartite scenario. That is, in the EACU Central scenario, we

[27] For an explanation of the methodology, see Morkre and Tarr (1980, chapter 3) or Matusz and Tarr (2000).

[28] This is the sum of compensation for subsistence labor (that receives 29.8 percent of value added) and all other categories of labor (which receive 30.6 percent). See Jensen, Rutherford and Tarr (2010).

estimate that about one-half of one percent of labor must change jobs, and between one percent and 1.5 percent of labor must change jobs in the other two scenarios.[29]

For μ, the Tanzanian National Panel Surveys of 2010 and 2011 found that national unemployment was rather low at 2.5 percent in 2010 and 3.3 percent in 2011.[30] Nonetheless, the Integrated Labor Force Survey reported that the national average duration of unemployment is rather high at 1.24 years, [31] i.e., μ = 1.24. Then, from equation 4, the social costs of adjustment, as a percent of GDP, are presented in row 1 of table 5.

In table 3, we have EV as a percent of private consumption. To compare with adjustment costs in equation 4, we need EV as a percent of GDP. Private consumption in Tanzania in 2012 was 66 percent of GDP.[32] Converting the estimates in table 3, we have EV as a percent of GDP for one year as shown in row 3 of table 5.

Crucially, adjustment costs are a once and for all cost, whereas the gains from the trade policy change continue into the infinite future. Taking the present value of the gains into the infinite future with a seven percent discount rate for future gains, the gains from our three principal scenarios, as a percent of GDP, are shown in row 4 of table 5. Then, the ratio of the gains to the adjustment costs from the trade policy change are shown in row 5 of table 5 as:

**EAC Central = 26.0; EACU Liberal = 81.5; Tripartite = 23.0.**

These results are consistent with the evidence from empirical studies, summarized by Matusz and Tarr (2000), which has shown that the adjustment costs of trade liberalization are dramatically smaller than the welfare gains.[33] However, policy-makers often receive strong lobbying from those who suffer adjustment costs from trade liberalization, while those who gain are more diverse or may not realize they will gain from trade liberalization; so the gainers typically do not lobby for liberalization or lobby much less vigorously. Thus, these results explain some of the appeal of regional liberalization to policy-makers, despite the usually larger net gains of broader unilateral or multilateral liberalization.

[29] The Tripartite scenario contains preferential tariff reduction, whereas the EACU Liberal scenario does not any tariff changes; this explains the larger adjustment costs for the Tripartite scenario.

[30] See National Bureau of Statistics of Tanzania (2013a, p.18).

[31] Calculated from data in National Bureau of Statistics of Tanzania (2011, table 6.14).

[32] National Bureau of Statistics of Tanzania (2013a, pp. 36, 37).

[33] Matusz and Tarr (2000) summarize the evidence on the adjustment costs of trade liberalization.

## 5. Poverty and Shared Prosperity Results of Deep Integration in East and Southern Africa.

### 5.1 Poverty Headcount Results

Results for the poverty headcount, percentage of the population below the poverty line and shared prosperity are displayed in Table 6. We find that deep integration in the Africa region reduces poverty beyond what would be achieved in the baseline-business as usual scenario for 2030. Deep integration within the Tripartire region has a larger impact on poverty reduction on the EACU member countries than deep integration within the EACU alone. In the Tripartite scenario, the results suggest a net reduction of 4.2 and 3.23 million of people living with less than PPP$1.25/day in EACU and COMESA-SADC, respectively. Unilateral liberalization by the EACU members would lift even more out of poverty-- an estimated 5.31 million in the region, but would have virtually zero effect in COMESA-SADC.

### 5.2 Shared Prosperity Results

**5.2.1 Impact on the incomes of the poorest 40 percent.** Regarding shared prosperity, both deep integration in the Tripartite region and unilateral liberalization would significantly increase the incomes of the poorest 40 percent of the population. We estimate that as a result of deep integration in the Tripartite region, incomes of the poorest 40 percent of the populations in the EACU would increase by between 4.1 percent for Tanzania to 7.7 percent for Kenya. For COMESA and SADC, the poorest 40 percent of the population would see an increase in their incomes of 2.2 percent and 1.5 percent, respectively. With unilateral liberalization, incomes of the poorest 40 percent of the EACU populations would increase by a larger amount than from our Tripartite scenario: from 7.5 percent for Uganda to 9.8 percent for Rwanda.

**5.2.2. Impact on the distribution of income.** Although unilateral liberalization by the EACU raises incomes of the bottom 40% more than in the Tripartite scenario, measured by the share of income of the bottom 40 percent, the Tripartite scenario would promote more equitable growth in the EACU than unilateral liberalization. For three of the four EACU countries we model, in the Tripartite scenario, the poorest 40 percent realize a larger increase in their incomes than the average of the entire population. The primary reason for these results is that the poor depend disproportionately on the earnings of unskilled labor, and unskilled labor earnings usually increase faster than the returns to capital, skilled labor and the natural resource (see table 4) in this scenario. This is principally because the trade facilitation scenario is the reform responsible for the largest

gains in the Tripartite scenario. Given our sector specific data set on trade facilitation, the trade facilitation scenario tends to favor agriculture, which is typically one of the most intensive users of unskilled labor. In the cases of Rwanda and Uganda, unskilled labor constitute 70 and 74 percent of value added in our dataset and are the most labor intensive sectors. So the expansion of agriculture drives up the relative wage of unskilled labor, yielding a reduction in inequality. On the other hand, with unilateral liberalization, it is services expansion that is the most important reform. The services sectors are the most intensive users of skilled labor, so their expansion drives up the relative wage of skilled labor, which tends to reduce the share of income of the bottom 40 percent.

## 6. Sensitivity Analysis

In this section, we assess the impact of parameter values and the key modeling assumption of rent capture on the results. We focus on the Near Term model. Through our "piecemeal sensitivity analysis" we will determine the most important parameters for the results, and we will assess how important the rent capture assumption is for the results. We examine the three aggregate policy scenarios: EACU Deep Integration, Tripartite FTA with Deep Integration and EACU Unilateral Liberalization. Our results are presented in table 7.

### 6.1 Impact of Rent Capture Assumption

In our central scenarios we assume that: it takes capital and labor to overcome the barriers; the rents from the barriers are "dissipated;" and the rents are recaptured by the domestic economy in the central scenarios. It is possible, however, that some of the barriers are not dissipated, but instead generate rents that are captured by domestic agents in our initial equilibrium. If so, then the rents that are captured initially by domestic agents would not be available as a net welfare gain since they are a loss to domestic agents; and the welfare analysis for rents is analogous to tariff loss. The "triangle" of efficiency gains will remain, but the welfare gains should be smaller when there are initial rents captured by domestic agents.

In table 7, the row labeled $\theta_r$ represents the share of rents captured initially by domestic agents. We only display results for Tanzania; tables of results for the other five African regions of our model are available in BTY. We retain all other modeling and parameter assumptions, but allow the initial rent capture share to be either zero (central value) or 1 (upper value)

For three of our African regions the welfare gains do not change dramatically. For Kenya and Uganda in the cases of deep integration within EACU or the Tripartite FTA the estimated

gains fall to about 95 percent of their level with rent capture. The gains fall by 12 percent for SADC in the Tripartite FTA scenario. This reflects low levels of Kenyan and Ugandan trade in goods and in services with these regions and hence low available rents. Recall that a substantial share of the Kenyan gains from the Tripartite FTA come from improved market access in COMESA services markets and it is COMESA not Kenya that gains from the capture of these rents. But the welfare gains to Kenya fall by more than fifty percent in the case of EACU liberal. This reflects large available rents in the case of services and non-tariff barriers in trade with regions outside of Africa.

On the other hand, the estimated gains fall considerably in the cases of Tanzania and COMESA. Table 7 shows that in the case of Tanzania, the welfare gains fall to about 60 to 70 percent of their original level in the case of EACU Deep Integration or Tripartite FTA scenarios. In the case of EACU unilateral liberalization, however, the welfare fall is dramatic-- from more than 7 percent of consumption to about 1 percent of consumption, deriving mostly from the lack of capture of the large rents that are impacted by unilateral liberalization of NTBs in Tanzania. For COMESA in the Tripartite FTA, the gains fall from 1.4 to 0.5 percent of consumption due to no rent capture in services. Results for Rwanda are between Kenya and Tanzania in terms of percentage reduction of the gains due to initial rent capture, but the pattern of a much stronger drop in the percentage of gains in the unilateral liberalization scenario prevails due to no capture of rents in services liberalization.

**6.2 Piecemeal Sensitivity Analysis (other than rent capture)**

We see that central results are rather robust with respect to most of the parameters. In the cases of the Tripartite FTA and EACU Deep Integration, the parameter that has the strongest impact on the results is the elasticity of substitution between firm varieties in imperfectly competitive goods sectors, $\sigma(q_i, q_j)$, as welfare estimates can vary up to about 114 percent of their central values, depending on the country and scenario. Following from the Le Chatelier principle, larger elasticities typically lead to larger welfare gains in response to welfare improving reforms, as the economy can adapt more readily. In the case of this parameter, however, there are offsetting impacts. Lower values of this elasticity imply that varieties are less close to each other, so additional varieties are worth more. Thus, theory is ambiguous regarding the impact of this parameter. The elasticity of substitution between imports from different regions in CRTS sectors, $\sigma(M, M)$, has a modest impact on welfare, but a more substantial impact on imports in some

sectors. Larger elasticities allow substitution toward the most efficient supplier at domestic prices, and, with one exception, the welfare gains are larger for Tanzania, Uganda and Rwanda in all three scenarios, as expected. In the case of EACU Deep Integration, however, there is a preference induced substitution away from non-EAC suppliers and trade diversion slightly dominates in the cases of Kenya and Tanzania. Further, for Kenya, there is a terms of trade loss that dominates the results and slightly lowers the welfare gain in the EACU Liberal scenario. Regarding trade, however, the difference in aggregate exports can be substantial, especially in percentage terms in the Tripartite scenario. For Kenya (Uganda), aggregate exports increase by 9.5 (19.3) percent with the GTAP elasticities, but 11.1 (25.8) percent with our central values. In the case of agriculture exports, the percentage differences are more substantial: for our six African regions, with GTAP elasticities, agricultural exports increase from between 3 and 26 percent, depending on the country. But with our central elasticities, estimated agricultural exports increase by five to eleven times more.

For each region, we have a vector of elasticities of firm supply with respect to price for imperfectly competitive goods and services sectors. In the EACU Liberal case, the welfare gains are about five percent larger in Kenya, Uganda and Rwanda with larger elasticities of firm supply.[34]

## 7. Policy Conclusions

### 7.1 Overall Gains by Region

In this paper, we have estimated the impact of reducing non-tariff barriers, improving trade facilitation and reducing services costs in the EAC, the Tripartite FTA and unilaterally by the EAC. We estimate that deep integration within the EACU alone will produce significant benefits for its members, but if expanded to include COMESA and SADC in a Tripartite deeply integrated FTA, it would substantially increase the benefits for our EACU countries. We find that SADC and COMESA would gain substantially from the Tripartite FTA, but their gains are about one-half the gains of Kenya, Tanzania and Uganda from deep integration within the Tripartite FTA. Tanzania and Rwanda gain dramatically more from unilateral liberalization rather

[34] In Tanzania the gains are approximately unchanged. If available varieties in IRTS goods fall, the welfare gain is smaller. In the EACU Deep Integration case, possible trade diversion leads to ambiguous results.

than preferential liberalization, but Kenya gains less from EACU Liberal (Unilateral) than from the Tripartite FTA.

**7.2. Sources of Gains by Region**

Our decomposition analysis reveals the reasons for these differences: (i) the augmented gains from reduction in time in trade costs in the Tripartite FTA are an important reason for the increase in gains to the EACU countries relative to deep integration within the EACU alone. These trade facilitation gains for the EACU countries are larger than in the unilateral liberalization scenario; (ii) SADC and COMESA gain from both trade facilitation and from non-tariff barrier reduction in the Tripartite region, but considerably less than the EACU countries since they have very high trade intensities with regions outside of the Tripartite region; (iii) for both Tanzania and Rwanda, EACU Liberal (Unilateral) by far yields the largest gains, but for different reasons. For Tanzania, it gains from the reduction of NTBs outside of the Tripartite region. For Rwanda, it is better access to non-Tripartite foreign services providers. But unilateral liberalization leads to larger adjustment costs for both Tanzania and Rwanda. Within the Tripartite FTA, trade facilitation is the reform that is most important to both countries; (iv) Uganda has the most at stake within the Tripartite area in trade facilitation. It would gain substantially from EACU Liberal due to better access to foreign service suppliers; (v) consistent with earlier estimates, our assessment of the gains in the Tripartite FTA show negligible impacts from tariff changes, with losses for some members. Schiff and Winters (2003) have found that the largest gains from regional integration come from the deep aspects of the agreements, so our results are consistent with the broader empirical and theoretical literature.

The near term results for the Kenya case are especially interesting since it gains more from the Tripartite FTA than from unilateral liberalization by the EACU in all three dimensions of our trade costs. We explained these results due to better market access under a protected regional umbrella and the logistics of trade facilitation reform. This extends the Wonnacott and Wonnacott (1981) result to services. Our results provide a rationale for the strong support of the Tripartite FTA by the Kenyan authorities.

**7.3. Poverty and Shared Prosperity Results.**

Our poverty results suggest that the effects of the trade reforms are pro-poor. For example, our estimates are that, as a result of deep integration within the Tripartite agreement, the number of poor in the whole region would be reduced by 7.43 million; and the incomes of the poorest 40

percent of the population increase from 1.5 percent in the case of SADC to 7.7 percent in the case of Kenya. Focusing on poverty reduction in Kenya, Tanzania, Uganda, and Rwanda, compared with Tripartite integration, these four countries would see poverty reduced by an additional 1.1 million from unilateral liberalization. This indicates that while deep regional integration is an important step in helping to reduce poverty, the region should not ignore the additional gains available from broader trade liberalization.

We find that countries are affected in different ways from the different aspects of the reforms, which could lead to countries lobbying for different reforms in terms of choosing the strategy that maximizes poverty reduction. This is typical in trade negotiations, as a country will often have to make a "concessions" in areas it is not highly motivated to reform, in order to obtain agreement from other countries on what is most important to it. For example, in the Tripartite scenario, the country that has the most to gain from services liberalization is Kenya: in terms of percentage poverty reduction (-0.62 percent) or incomes of the poorest 40 percent (increase of 2.33 percent), Kenya has the most to gain from Tripartite services liberalization. However, based on the percent living in poverty or the results for shared prosperity, Rwanda and Uganda have the most to gain from trade facilitation. Since all these reforms benefit all the countries, but to different degrees, the "exchange of concessions" would lead to a more desirable trade agreement.

Although our results for unilateral liberalization by EACU show the largest gains for the EACU countries, we find little or no gains for COMESA or SADC from EACU unilateral liberalization. But the COMESA and SADC regions are free to unilaterally liberalize themselves; and if they were to do so, they would be expected to achieve significant gains for the poor, comparable to the EACU countries.

Despite increases in the incomes of the poorest 40 percent of the populations in all of our trade policy scenarios (where the country or region was an active participant in the reform), there are two concerns. First, in some cases, inequality increases, i.e., the incomes for the richest 40 percent increase faster than the increases in incomes of the poorest 40 percent. Second, we have estimated that adjustment costs are only a small percentage of the gains from trade liberalization; nonetheless, the poor are often very badly equipped to handle adjustment costs. This highlights the need for effective safety net programs to be in place to assist the poor

### 7.4 Policies to Reduce Non-Tariff Barriers and Services Costs and to Improve Trade Facilitation

Cadot and Gourdon (2014) have shown that the old command and control non-tariff measures, like quotas, bans and licenses have significantly declined in importance; but sanitary and phyto-sanitary (SPS) regulations and standards as technical barriers to trade (TBTs) have become the new non-tariff measures that restrict trade. SPS regulations and standards on industrial goods, however, have legitimate regulatory functions. For example, in the case of SPS, countries have the right and obligation to protect human, animal and plant life. The World Trade Organization SPS and TBT agreements recognize these legitimate regulatory functions, but call for these regulations to be applied in a manner that does not discriminate against imports.[35] Similarly, there are legitimate regulatory functions in many services areas such as banking, insurance and telecommunications; these regulations are a problem when they are applied in a discriminatory manner or impose excessive costs.

Given the importance for developing countries of reducing trade costs, global experts in the field of non-tariff measures, trade facilitation and services (including the World Bank, the International Trade Centre, the Asian Development Bank and the World Economic Forum *et al.*, (2013))[36] recommend establishing an effective regulatory review and improvement mechanism. Crucially, there should be public-private partnerships that involve the active engagement of the business community, economic policy officials and regulators organized around the supply chain as a whole in a sector or area of trade. The process would be overseen by a focal point within government with a mandate to coordinate and oversee all regulation that directly affects supply chain efficiency. To be effective in reducing trade costs requires coherence and coordination across many government agencies and collaboration with industry. The process should generate information on sources of trade costs through regular assessments of regulatory trade barriers and costs, and concrete action agendas and proposals for reforms.

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**Table 1: List of Sectors, Regions and Factors of Production in the Eastern and Southern Africa Model**

| **Business Services with FDI** | **Dixit-Stigliz Goods** |
|---|---|
| Air Transport | Chemicals Mineral and Metal Products |
| Communication | Energy and Minerals |
| Insurance | Food Products |
| Business Services nec | Petroleum and Coal Products |
| Financial Services nec | Other Manufacturing |
| Transport nec | Textile, Apparel and Leather Products |
| Water Transport | Wood and Paper Products |
| | |
| **CRTS Goods and Services** | **Regions** |
| Agriculture and Forestry | Kenya |
| Other Services | Tanzania |
| Trade | Uganda |
| Utilities | Rwanda |
| | COMESA |
| **Factors of Production** | SADC |
| Skilled labor | USA |
| Unskilled labor | European Union (EUR) |
| Capital | China |
| Natural Resources | Rest of the World (ROW) |

# Table 2a: Benchmark Distortions in Kenya (Ad valorem values in percentage)

**Ad Valorem Values or Equivalents**

| | Barriers Against Service Providers | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Discriminatory | | | | | | | | | Non-Discriminatory |
| | Tanzania | Uganda | Rwanda | COMESA | SADC | USA | EUR | China | ROW | |
| **Business Services** | | | | | | | | | | |
| Air Transport | 38.0 | 38.0 | 38.0 | 38.0 | 38.0 | 38.0 | 38.0 | 38.0 | 38.0 | 0.0 |
| Communication | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 3.4 |
| Insurance | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 | 11.6 |
| Business Services nec | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 13.0 |
| Financial Services nec | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 18.6 |
| Transport nec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 |
| Water Transport | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 0.0 |
| | Tariff Rates on Goods | | | | | | | | | Non-Tariff Measures |
| | Tanzania | Uganda | Rwanda | COMESA | SADC | USA | EUR | China | ROW | |
| **Goods** | | | | | | | | | | |
| Chemicals Mineral and Metal Products | 0.0 | 0.0 | 0.0 | 0.0 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 0.3 |
| Energy and Minerals | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 0.3 |
| Food Products | 0.0 | 0.0 | 0.0 | 0.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 0.3 |
| Petroleum and Coal Products | 0.0 | 0.0 | 0.0 | 0.0 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 0.3 |
| Other Manufacturing | 0.0 | 0.0 | 0.0 | 0.0 | 16.1 | 16.1 | 16.1 | 16.1 | 16.1 | 0.3 |
| Textile and Apparel | 0.0 | 0.0 | 0.0 | 0.0 | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | 0.3 |
| Wood and Paper Products | 0.0 | 0.0 | 0.0 | 0.0 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 0.3 |
| Agriculture and Forestry | 0.0 | 0.0 | 0.0 | 0.0 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 14.6 |
| | Barriers to Efficient Trade Facilitation on Exports | | | | | | | | | |
| Chemicals Mineral and Metal Products | 21.4 | 22.3 | 21.5 | 21.7 | 27.0 | 16.9 | 20.1 | 18.3 | 21.2 | |
| Energy and Minerals | 12.6 | 12.6 | 12.6 | 12.6 | 12.5 | 12.3 | 12.6 | 12.6 | 12.2 | |
| Food Products | 22.3 | 13.5 | 21.2 | 11.8 | 16.3 | 15.1 | 16.3 | 12.8 | 20.3 | |
| Petroleum and Coal Products | 27.9 | 27.9 | 27.9 | 27.9 | 27.9 | 27.9 | 27.9 | 27.9 | 27.9 | |
| Other Manufacturing | 16.2 | 15.7 | 14.5 | 15.8 | 14.2 | 11.1 | 11.5 | 15.9 | 8.7 | |
| Textile and Apparel | 7.1 | 8.1 | 8.0 | 8.6 | 8.2 | 10.0 | 7.8 | 7.9 | 7.8 | |
| Wood and Paper Products | 15.9 | 23.1 | 18.0 | 13.7 | 19.1 | 11.5 | 13.3 | 14.8 | 15.2 | |
| Agriculture and Forestry | 21.3 | 26.6 | 21.0 | 15.9 | 25.3 | 22.7 | 25.9 | 23.5 | 19.1 | |
| | Barriers to Efficient Trade Facilitation on Imports | | | | | | | | | |
| Chemicals Mineral and Metal Products | 25.6 | 45.9 | 42.9 | 9.5 | 30.7 | 4.3 | 6.8 | 13.4 | 14.1 | |
| Energy and Minerals | 14.3 | 18.9 | 19.8 | 4.6 | 16.0 | 2.8 | 4.4 | 8.1 | 9.9 | |
| Food Products | 20.1 | 27.2 | 22.9 | 14.7 | 19.4 | 4.6 | 7.6 | 13.2 | 10.5 | |
| Petroleum and Coal Products | 31.9 | 41.9 | 43.9 | 36.8 | 35.5 | 6.0 | 12.3 | 18.0 | 21.4 | |
| Other Manufacturing | 12.6 | 22.7 | 24.6 | 7.2 | 15.5 | 1.7 | 4.3 | 8.6 | 9.5 | |
| Textile and Apparel | 9.4 | 12.2 | 14.9 | 4.6 | 20.6 | 1.8 | 7.4 | 5.9 | 7.0 | |
| Wood and Paper Products | 12.9 | 10.0 | 17.3 | 10.7 | 30.4 | 3.8 | 8.5 | 12.0 | 14.4 | |
| Agriculture and Forestry | 23.1 | 41.4 | 24.8 | 18.3 | 35.0 | 8.0 | 8.3 | 20.8 | 21.2 | |

## Table 2b: Benchmark Distortions in Tanzania; Ad valorem values in percentage.

| | Barriers Against Service Providers | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Discriminatory | | | | | | | | | Non-Discriminatory |
| | Kenya | Uganda | Rwanda | COMESA | SADC | USA | EUR | China | ROW | |
| **Business Services** | | | | | | | | | | |
| Air Transport | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 0.0 |
| Communication | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 3.1 |
| Insurance | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 17.9 |
| Business Services nec | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 |
| Financial Services nec | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 14.7 |
| Transport nec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Water Transport | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 0.0 |
| | Tariff Rates on Goods | | | | | | | | | Non-Tariff Measures |
| | Kenya | Uganda | Rwanda | COMESA | SADC | USA | EUR | China | ROW | |
| **Goods** | | | | | | | | | | |
| Chemicals Mineral and Metal Products | 0.0 | 0.0 | 0.0 | 4.4 | 0.0 | 4.4 | 4.4 | 4.4 | 4.4 | 47.4 |
| Energy and Minerals | 0.0 | 0.0 | 0.0 | 3.2 | 0.0 | 3.2 | 3.2 | 3.2 | 3.2 | 47.4 |
| Food Products | 0.0 | 0.0 | 0.0 | 13.4 | 0.0 | 13.4 | 13.4 | 13.4 | 13.4 | 47.4 |
| Petroleum and Coal Products | 0.0 | 0.0 | 0.0 | 3.2 | 0.0 | 3.2 | 3.2 | 3.2 | 3.2 | 47.4 |
| Other Manufacturing | 0.0 | 0.0 | 0.0 | 6.3 | 0.0 | 6.3 | 6.3 | 6.3 | 6.3 | 47.4 |
| Textile and Apparel | 0.0 | 0.0 | 0.0 | 29.7 | 0.0 | 29.7 | 29.7 | 29.7 | 29.7 | 47.4 |
| Wood and Paper Products | 0.0 | 0.0 | 0.0 | 11.6 | 0.0 | 11.6 | 11.6 | 11.6 | 11.6 | 47.4 |
| Agriculture and Forestry | 0.0 | 0.0 | 0.0 | 11.9 | 0.0 | 11.9 | 11.9 | 11.9 | 11.9 | 22.2 |
| | Barriers to Efficient Trade Facilitation on Exports | | | | | | | | | |
| Chemicals Mineral and Metal Products | 16.2 | 16.1 | 14.2 | 14.0 | 16.1 | 12.9 | 13.7 | 15.9 | 16.2 | |
| Energy and Minerals | 9.0 | 7.6 | 9.0 | 9.0 | 5.4 | 5.4 | 8.6 | 9.0 | 8.4 | |
| Food Products | 12.6 | 15.3 | 16.4 | 12.1 | 13.8 | 7.6 | 14.7 | 9.8 | 13.9 | |
| Petroleum and Coal Products | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | |
| Other Manufacturing | 7.8 | 6.4 | 13.1 | 10.2 | 10.2 | 9.4 | 9.3 | 9.8 | 9.6 | |
| Textile and Apparel | 5.9 | 5.7 | 5.8 | 5.6 | 6.3 | 6.8 | 7.2 | 6.6 | 7.5 | |
| Wood and Paper Products | 8.3 | 15.1 | 11.2 | 10.8 | 9.5 | 5.8 | 6.3 | 4.3 | 15.2 | |
| Agriculture and Forestry | 14.3 | 18.2 | 28.7 | 12.5 | 17.6 | 17.9 | 15.2 | 13.1 | 18.0 | |
| | Barriers to Efficient Trade Facilitation on Imports | | | | | | | | | |
| Chemicals Mineral and Metal Products | 19.9 | 38.6 | 58.8 | 9.2 | 29.3 | 4.8 | 5.9 | 14.8 | 13.5 | |
| Energy and Minerals | 11.7 | 18.9 | 19.8 | 4.5 | 17.3 | 2.6 | 3.9 | 8.2 | 9.2 | |
| Food Products | 20.7 | 30.7 | 27.9 | 41.9 | 19.7 | 4.8 | 4.8 | 11.3 | 10.8 | |
| Petroleum and Coal Products | 25.9 | 41.9 | 43.9 | 38.1 | 36.0 | 6.0 | 14.1 | 18.0 | 17.8 | |
| Other Manufacturing | 15.1 | 26.9 | 42.6 | 3.4 | 16.3 | 2.0 | 4.1 | 8.6 | 8.2 | |
| Textile and Apparel | 6.5 | 12.8 | 13.8 | 5.3 | 15.0 | 2.1 | 3.9 | 5.9 | 7.2 | |
| Wood and Paper Products | 14.7 | 17.6 | 49.9 | 10.8 | 33.9 | 2.6 | 7.9 | 9.6 | 9.7 | |
| Agriculture and Forestry | 19.8 | 34.7 | 54.2 | 20.4 | 30.3 | 8.7 | 9.0 | 17.9 | 15.6 | |

## Table 2c: Benchmark Distortions in Uganda; Ad valorem values in percentage.

| | Barriers Against Service Providers | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Discriminatory | | | | | | | | | Non-Discriminatory |
| | Kenya | Tanzania | Rwanda | COMESA | SADC | USA | EUR | China | ROW | |
| **Business Services** | | | | | | | | | | |
| Air Transport | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Communication | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | 0.0 |
| Insurance | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 0.0 |
| Business Services nec | 43.0 | 43.0 | 43.0 | 43.0 | 43.0 | 43.0 | 43.0 | 43.0 | 43.0 | 0.0 |
| Financial Services nec | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Transport nec | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 0.0 |
| Water Transport | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Tariff Rates on Goods | | | | | | | | | Non-Tariff Measures |
| | Kenya | Tanzania | Rwanda | COMESA | SADC | USA | EUR | China | ROW | |
| **Goods** | | | | | | | | | | |
| Chemicals Mineral and Metal Products | 0.0 | 0.0 | 0.0 | 0.0 | 6.2 | 6.6 | 5.2 | 10.7 | 9.6 | 0.0 |
| Energy and Minerals | 0.0 | 0.0 | 0.0 | 0.0 | 3.3 | 1.8 | 1.3 | 0.1 | 2.8 | 0.0 |
| Food Products | 0.0 | 0.0 | 0.0 | 0.0 | 66.4 | 19.4 | 19.6 | 21.5 | 20.9 | 0.0 |
| Petroleum and Coal Products | 0.0 | 0.0 | 0.0 | 0.0 | 10.0 | 6.5 | 4.1 | 0.0 | 7.1 | 0.0 |
| Other Manufacturing | 0.0 | 0.0 | 0.0 | 0.0 | 7.3 | 5.6 | 4.1 | 7.0 | 11.2 | 0.0 |
| Textile and Apparel | 0.0 | 0.0 | 0.0 | 0.0 | 21.7 | 20.8 | 20.8 | 24.6 | 20.6 | 0.0 |
| Wood and Paper Products | 0.0 | 0.0 | 0.0 | 0.0 | 15.8 | 13.6 | 10.5 | 21.1 | 20.0 | 0.0 |
| Agriculture and Forestry | 0.0 | 0.0 | 0.0 | 0.0 | 15.8 | 14.8 | 17.5 | 14.4 | 3.1 | 3.9 |
| | Barriers to Efficient Trade Facilitation on Exports | | | | | | | | | |
| Chemicals Mineral and Metal Products | 52.4 | 44.9 | 48.4 | 44.5 | 51.7 | 28.7 | 32.6 | 29.1 | 36.8 | |
| Energy and Minerals | 21.6 | 21.6 | 21.6 | 21.6 | 22.1 | 21.6 | 21.7 | 21.6 | 21.6 | |
| Food Products | 31.1 | 35.1 | 38.0 | 24.6 | 24.3 | 31.9 | 38.2 | 23.1 | 30.5 | |
| Petroleum and Coal Products | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | |
| Other Manufacturing | 25.9 | 30.7 | 23.8 | 34.2 | 21.4 | 18.4 | 24.1 | 30.9 | 26.6 | |
| Textile and Apparel | 14.1 | 14.6 | 13.5 | 14.2 | 14.3 | 14.7 | 15.9 | 12.8 | 15.4 | |
| Wood and Paper Products | 11.4 | 20.1 | 21.3 | 32.8 | 14.1 | 22.6 | 23.6 | 19.8 | 17.1 | |
| Agriculture and Forestry | 46.6 | 39.8 | 35.1 | 36.1 | 36.5 | 36.8 | 35.9 | 38.7 | 34.7 | |
| | Barriers to Efficient Trade Facilitation on Imports | | | | | | | | | |
| Chemicals Mineral and Metal Products | 20.8 | 25.7 | 35.7 | 15.1 | 24.7 | 4.3 | 5.3 | 13.6 | 12.9 | |
| Energy and Minerals | 11.7 | 12.1 | 19.8 | 5.1 | 16.3 | 2.7 | 4.2 | 8.1 | 7.8 | |
| Food Products | 12.4 | 24.4 | 17.2 | 7.7 | 18.5 | 4.4 | 6.1 | 14.2 | 11.7 | |
| Petroleum and Coal Products | 25.9 | 31.9 | 43.9 | 11.3 | 35.8 | 6.0 | 10.8 | 18.0 | 14.4 | |
| Other Manufacturing | 14.6 | 10.2 | 31.4 | 5.0 | 16.6 | 2.0 | 3.8 | 6.8 | 9.7 | |
| Textile and Apparel | 7.5 | 9.2 | 9.1 | 5.1 | 17.7 | 2.2 | 4.0 | 4.9 | 5.0 | |
| Wood and Paper Products | 21.4 | 23.8 | 8.7 | 11.3 | 29.4 | 3.0 | 6.7 | 6.5 | 12.6 | |
| Agriculture and Forestry | 25.8 | 29.4 | 35.8 | 27.9 | 40.9 | 8.2 | 6.0 | 19.8 | 24.1 | |

## Table 2d: Benchmark Distortions in Rwanda; Ad valorem values in percentage.

| | Barriers Against Service Providers | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Discriminatory | | | | | | | | | Non-Discriminatory |
| | Kenya | Tanzania | Uganda | COMESA | SADC | USA | EUR | China | ROW | |
| **Business Services** | | | | | | | | | | |
| Air Transport | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Communication | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 0.0 |
| Insurance | 35.0 | 35.0 | 35.0 | 35.0 | 35.0 | 35.0 | 35.0 | 35.0 | 35.0 | 0.0 |
| Business Services nec | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 0.0 |
| Financial Services nec | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 | 0.0 |
| Transport nec | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 0.0 |
| Water Transport | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Tariff Rates on Goods | | | | | | | | | Non-Tariff Measures |
| | Kenya | Tanzania | Uganda | COMESA | SADC | USA | EUR | China | ROW | |
| **Goods** | | | | | | | | | | |
| Chemicals Mineral and Metal Products | 0.0 | 0.0 | 0.0 | 0.0 | 16.3 | 14.8 | 14.9 | 20.7 | 10.6 | 4.8 |
| Energy and Minerals | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 | 0.0 | 3.0 | 0.2 | 4.6 | 4.8 |
| Food Products | 0.0 | 0.0 | 0.0 | 0.0 | 16.4 | 22.7 | 20.2 | 19.9 | 20.7 | 4.8 |
| Petroleum and Coal Products | 0.0 | 0.0 | 0.0 | 0.0 | 15.2 | 0.0 | 9.6 | 0.0 | 15.1 | 4.8 |
| Other Manufacturing | 0.0 | 0.0 | 0.0 | 0.0 | 17.8 | 18.8 | 19.3 | 16.8 | 18.8 | 4.8 |
| Textile and Apparel | 0.0 | 0.0 | 0.0 | 0.0 | 6.6 | 25.4 | 23.4 | 26.5 | 22.6 | 4.8 |
| Wood and Paper Products | 0.0 | 0.0 | 0.0 | 0.0 | 11.3 | 22.3 | 19.7 | 21.1 | 18.5 | 4.8 |
| Agriculture and Forestry | 0.0 | 0.0 | 0.0 | 0.0 | 4.6 | 4.9 | 5.4 | 0.7 | 5.1 | 0.0 |
| | Barriers to Efficient Trade Facilitation on Exports | | | | | | | | | |
| Chemicals Mineral and Metal Products | 39.0 | 53.4 | 32.5 | 29.7 | 27.3 | 27.7 | 27.3 | 35.6 | 30.2 | |
| Energy and Minerals | 18.0 | 18.0 | 18.0 | 18.4 | 18.0 | 18.0 | 18.0 | 18.0 | 18.0 | |
| Food Products | 20.8 | 23.3 | 15.8 | 29.3 | 16.1 | 9.0 | 16.4 | 16.2 | 19.2 | |
| Petroleum and Coal Products | 39.9 | 39.9 | 39.9 | 39.9 | 39.9 | 39.9 | 39.9 | 39.9 | 39.9 | |
| Other Manufacturing | 22.3 | 38.2 | 28.5 | 14.5 | 18.4 | 16.3 | 17.9 | 24.2 | 16.7 | |
| Textile and Apparel | 13.5 | 12.5 | 8.3 | 8.0 | 10.9 | 19.5 | 10.6 | 8.6 | 12.2 | |
| Wood and Paper Products | 16.0 | 45.1 | 7.9 | 28.5 | 19.4 | 9.6 | 15.3 | 32.3 | 17.9 | |
| Agriculture and Forestry | 22.6 | 47.1 | 31.5 | 57.0 | 29.5 | 31.6 | 30.3 | 44.4 | 25.3 | |
| | Barriers to Efficient Trade Facilitation on Imports | | | | | | | | | |
| Chemicals Mineral and Metal Products | 20.0 | 22.7 | 42.1 | 11.8 | 24.3 | 3.7 | 5.5 | 14.1 | 10.7 | |
| Energy and Minerals | 11.7 | 14.4 | 18.9 | 18.0 | 16.3 | 2.7 | 4.3 | 8.3 | 19.9 | |
| Food Products | 19.8 | 26.3 | 33.3 | 15.2 | 27.9 | 4.9 | 4.3 | 9.1 | 8.7 | |
| Petroleum and Coal Products | 25.9 | 31.9 | 41.9 | 11.0 | 36.8 | 6.0 | 9.4 | 18.0 | 14.1 | |
| Other Manufacturing | 13.6 | 21.0 | 21.0 | 16.7 | 23.6 | 2.4 | 3.8 | 8.3 | 8.1 | |
| Textile and Apparel | 7.4 | 9.3 | 11.7 | 9.9 | 5.2 | 1.9 | 3.2 | 5.3 | 3.8 | |
| Wood and Paper Products | 16.7 | 17.4 | 18.6 | 9.1 | 20.3 | 2.5 | 6.6 | 9.3 | 10.0 | |
| Agriculture and Forestry | 19.4 | 46.1 | 32.9 | 39.8 | 9.6 | 8.7 | 5.0 | 14.9 | 26.4 | |

## Table 2e: Benchmark Distortions in COMESA; Ad valorem values in percentage.

| | Barriers Against Service Providers | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Discriminatory | | | | | | | | | | Non-Discriminatory |
| | Kenya | Tanzania | Uganda | Rwanda | COMESA | SADC | USA | EUR | China | ROW | |
| **Business Services** | | | | | | | | | | | |
| Air Transport | 45.0 | 45.0 | 45.0 | 45.0 | 0.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 0.0 |
| Communication | 40.0 | 40.0 | 40.0 | 40.0 | 0.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 0.0 |
| Insurance | 102.0 | 102.0 | 102.0 | 102.0 | 0.0 | 102.0 | 102.0 | 102.0 | 102.0 | 102.0 | 0.0 |
| Business Services nec | 36.0 | 36.0 | 36.0 | 36.0 | 0.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 0.0 |
| Financial Services nec | 101.0 | 101.0 | 101.0 | 101.0 | 0.0 | 101.0 | 101.0 | 101.0 | 101.0 | 101.0 | 0.0 |
| Transport nec | 25.0 | 25.0 | 25.0 | 25.0 | 0.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 0.0 |
| Water Transport | 56.0 | 56.0 | 56.0 | 56.0 | 0.0 | 56.0 | 56.0 | 56.0 | 56.0 | 56.0 | 0.0 |
| | Tariff Rates on Goods | | | | | | | | | | Non-Tariff Measures |
| | Kenya | Tanzania | Uganda | Rwanda | COMESA | SADC | USA | EUR | China | ROW | |
| **Goods** | | | | | | | | | | | |
| Chemicals Mineral and Metal Products | 0.0 | 14.3 | 0.0 | 0.0 | 0.0 | 10.5 | 7.7 | 8.9 | 13.3 | 7.8 | 20.1 |
| Energy and Minerals | 0.0 | 8.8 | 0.0 | 0.0 | 0.0 | 4.4 | 1.4 | 0.7 | 2.3 | 0.3 | 20.1 |
| Food Products | 0.0 | 26.7 | 0.0 | 0.0 | 0.0 | 35.7 | 11.5 | 84.2 | 25.6 | 9.0 | 20.1 |
| Petroleum and Coal Products | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 11.4 | 6.2 | 6.7 | 9.2 | 4.4 | 20.1 |
| Other Manufacturing | 0.0 | 12.6 | 0.0 | 0.0 | 0.0 | 13.4 | 6.3 | 7.4 | 10.5 | 13.0 | 20.1 |
| Textile and Apparel | 0.0 | 22.2 | 0.0 | 0.0 | 0.0 | 18.0 | 15.3 | 20.6 | 30.2 | 13.5 | 20.1 |
| Wood and Paper Products | 0.0 | 20.1 | 0.0 | 0.0 | 0.0 | 7.6 | 8.2 | 9.4 | 22.6 | 8.3 | 20.1 |
| Agriculture and Forestry | 0.0 | 12.0 | 0.0 | 0.0 | 0.0 | 2.4 | 2.3 | 5.3 | 14.6 | 3.9 | 27.5 |
| | Barriers to Efficient Trade Facilitation on Exports | | | | | | | | | | |
| Chemicals Mineral and Metal Products | 9.4 | 9.0 | 12.7 | 10.0 | 10.5 | 10.8 | 8.4 | 9.3 | 14.2 | 11.3 | |
| Energy and Minerals | 4.5 | 4.5 | 4.9 | 12.4 | 4.6 | 4.6 | 6.2 | 5.0 | 5.5 | 4.7 | |
| Food Products | 12.5 | 30.3 | 7.7 | 11.3 | 13.9 | 20.7 | 8.7 | 10.2 | 13.1 | 9.2 | |
| Petroleum and Coal Products | 25.8 | 26.5 | 10.7 | 10.5 | 25.2 | 17.4 | 10.8 | 10.2 | 14.3 | 10.8 | |
| Other Manufacturing | 6.0 | 3.3 | 4.6 | 13.3 | 5.5 | 6.3 | 7.2 | 4.6 | 8.6 | 5.4 | |
| Textile and Apparel | 4.6 | 5.3 | 5.0 | 7.2 | 10.1 | 4.9 | 3.6 | 3.7 | 4.3 | 4.7 | |
| Wood and Paper Products | 10.7 | 10.9 | 11.3 | 8.9 | 7.3 | 7.8 | 4.6 | 5.9 | 5.7 | 6.7 | |
| Agriculture and Forestry | 16.9 | 15.9 | 19.7 | 26.5 | 21.5 | 26.6 | 19.9 | 17.8 | 14.8 | 15.6 | |
| | Barriers to Efficient Trade Facilitation on Imports | | | | | | | | | | |
| Chemicals Mineral and Metal Products | 20.2 | 22.5 | 39.0 | 32.8 | 10.9 | 37.0 | 5.1 | 8.2 | 14.3 | 14.3 | |
| Energy and Minerals | 11.7 | 14.4 | 18.9 | 20.2 | 4.6 | 9.8 | 2.7 | 4.2 | 8.1 | 8.3 | |
| Food Products | 10.9 | 19.3 | 21.2 | 32.2 | 13.8 | 15.9 | 5.0 | 6.6 | 12.8 | 13.1 | |
| Petroleum and Coal Products | 25.9 | 31.9 | 41.9 | 43.9 | 35.8 | 27.9 | 6.0 | 12.0 | 18.0 | 22.1 | |
| Other Manufacturing | 14.8 | 16.4 | 30.2 | 16.0 | 6.2 | 17.0 | 2.1 | 4.4 | 7.9 | 8.0 | |
| Textile and Apparel | 8.0 | 9.0 | 12.5 | 8.2 | 11.4 | 9.5 | 2.1 | 5.1 | 7.0 | 7.4 | |
| Wood and Paper Products | 12.4 | 17.3 | 28.7 | 31.5 | 7.3 | 21.5 | 5.1 | 7.2 | 6.8 | 11.0 | |
| Agriculture and Forestry | 14.7 | 19.9 | 31.7 | 63.1 | 20.3 | 37.5 | 7.1 | 10.7 | 16.9 | 17.8 | |

## Table 2f: Benchmark Distortions in SADC; Ad valorem values in percentage.

| | Barriers Against Service Providers | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Discriminatory | | | | | | | | | | Non-Discriminatory |
| | Kenya | Tanzania | Uganda | Rwanda | COMESA | SADC | USA | EUR | China | ROW | |
| **Business Services** | | | | | | | | | | | |
| Air Transport | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 0.0 | 30.0 | 30.0 | 30.0 | 30.0 | 0.0 |
| Communication | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 0.0 | 53.0 | 53.0 | 53.0 | 53.0 | 0.0 |
| Insurance | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 0.0 | 22.0 | 22.0 | 22.0 | 22.0 | 0.0 |
| Business Services nec | 38.0 | 38.0 | 38.0 | 38.0 | 38.0 | 0.0 | 38.0 | 38.0 | 38.0 | 38.0 | 0.0 |
| Financial Services nec | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 0.0 | 15.0 | 15.0 | 15.0 | 15.0 | 0.0 |
| Transport nec | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 | 0.0 | 27.0 | 27.0 | 27.0 | 27.0 | 0.0 |
| Water Transport | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 0.0 | 7.0 | 7.0 | 7.0 | 7.0 | 0.0 |
| | **Tariff Rates on Goods** | | | | | | | | | | **Non-Tariff Measures** |
| | Kenya | Tanzania | Uganda | Rwanda | COMESA | SADC | USA | EUR | China | ROW | |
| **Goods** | | | | | | | | | | | |
| Chemicals Mineral and Metal Products | 1.5 | 0.0 | 13.8 | 0.6 | 2.5 | 0.0 | 4.7 | 4.2 | 8.5 | 3.7 | 0.4 |
| Energy and Minerals | 4.2 | 0.0 | 0.0 | 0.0 | 6.9 | 0.0 | 2.5 | 0.2 | 3.4 | 0.2 | 0.4 |
| Food Products | 1.1 | 0.0 | 17.3 | 0.0 | 2.5 | 0.0 | 13.9 | 11.6 | 10.1 | 10.1 | 0.4 |
| Petroleum and Coal Products | 1.9 | 0.0 | 9.7 | 0.0 | 1.2 | 0.0 | 2.3 | 6.1 | 1.4 | 5.6 | 0.4 |
| Other Manufacturing | 1.5 | 0.0 | 5.1 | 1.9 | 3.8 | 0.0 | 4.9 | 5.5 | 6.0 | 10.0 | 0.4 |
| Textile and Apparel | 6.5 | 0.0 | 10.0 | 0.0 | 19.7 | 0.0 | 21.0 | 11.1 | 26.1 | 18.7 | 0.4 |
| Wood and Paper Products | 3.9 | 0.0 | 15.9 | 15.6 | 8.4 | 0.0 | 4.8 | 6.1 | 15.7 | 8.7 | 0.4 |
| Agriculture and Forestry | 12.8 | 0.0 | 32.0 | 0.1 | 4.6 | 0.0 | 3.2 | 3.0 | 6.6 | 5.1 | 4.5 |
| | **Barriers to Efficient Trade Facilitation on Exports** | | | | | | | | | | |
| Chemicals Mineral and Metal Products | 17.4 | 16.5 | 14.2 | 14.2 | 21.8 | 21.3 | 16.0 | 17.6 | 20.0 | 18.5 | |
| Energy and Minerals | 8.9 | 9.7 | 9.1 | 9.1 | 7.7 | 14.0 | 11.1 | 12.5 | 10.0 | 11.8 | |
| Food Products | 11.0 | 11.5 | 10.5 | 18.3 | 9.9 | 16.1 | 9.0 | 9.6 | 13.4 | 12.7 | |
| Petroleum and Coal Products | 19.9 | 20.1 | 19.9 | 22.6 | 18.1 | 20.2 | 35.3 | 21.9 | 20.0 | 23.7 | |
| Other Manufacturing | 8.7 | 9.2 | 9.2 | 13.3 | 9.6 | 11.2 | 11.8 | 8.3 | 8.6 | 13.8 | |
| Textile and Apparel | 12.8 | 8.6 | 10.0 | 3.5 | 6.1 | 7.8 | 7.5 | 5.4 | 8.8 | 7.9 | |
| Wood and Paper Products | 16.9 | 18.9 | 16.4 | 11.4 | 12.7 | 13.4 | 11.6 | 11.5 | 20.2 | 13.8 | |
| Agriculture and Forestry | 20.0 | 16.9 | 21.9 | 5.5 | 23.7 | 20.0 | 20.0 | 23.6 | 18.5 | 23.3 | |
| | **Barriers to Efficient Trade Facilitation on Imports** | | | | | | | | | | |
| Chemicals Mineral and Metal Products | 24.9 | 25.9 | 45.6 | 30.1 | 11.7 | 34.8 | 4.4 | 6.9 | 12.6 | 13.9 | |
| Energy and Minerals | 11.6 | 8.7 | 19.3 | 19.8 | 4.7 | 21.6 | 2.7 | 3.7 | 8.1 | 12.1 | |
| Food Products | 15.3 | 22.2 | 21.1 | 17.7 | 28.9 | 26.0 | 4.5 | 7.0 | 14.5 | 11.9 | |
| Petroleum and Coal Products | 25.9 | 31.9 | 41.9 | 43.9 | 22.5 | 36.1 | 6.0 | 9.5 | 18.0 | 18.6 | |
| Other Manufacturing | 13.4 | 16.7 | 19.5 | 20.2 | 7.8 | 19.3 | 2.8 | 5.0 | 8.8 | 8.5 | |
| Textile and Apparel | 7.5 | 10.1 | 12.2 | 11.9 | 4.9 | 12.8 | 1.8 | 4.0 | 5.7 | 5.7 | |
| Wood and Paper Products | 17.4 | 15.3 | 12.3 | 19.8 | 7.9 | 22.4 | 4.2 | 6.9 | 5.8 | 9.9 | |
| Agriculture and Forestry | 24.0 | 28.1 | 31.8 | 32.5 | 26.3 | 33.1 | 6.6 | 7.5 | 20.0 | 15.9 | |

## Table 3: Deep Integration within the Tripartite FTA and the East Africa Customs Union (EAC) and Unilateral Reforms by the EACU

### Near Term Results-- (Results are percentage change from initial equilibrium)

| Scenario definition | Benchmark | EACU Central: (Trade Facilitation plus services and NTB liberalization) | EACU: only Trade Facilita-tion** | EACU: only services liberaliza-tion | EACU: only NTB liberaliza-tion | EACU Liberal: Multilateral services and NTM refrom plus Trade Facilitation within EACU | EACU Liberal: only services liberaliza-tion | EACU Liberal: only NTB liberaliza-tion | Tripartite central: Trade Facilitation plus services and NTB liberalization | Tripartite: only Trade Facilitation | Tripartite: only services liberaliza-tion | Tripartite: only NTB liberaliza-tion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time in Trade Costs: 20% reduction within EACU (Tripartite) countries* | No | Yes | Yes | No | No | Yes | No | No | Yes | Yes | No | No |
| Time in Trade Costs: 5% reduction with non-EACU (Tripartite) countries* | No | Yes | Yes | No | No | Yes | No | No | Yes | Yes | No | No |
| Services Liberalization: 50% reduction of discriminatory barriers within EACU (Tripartite)* | No | Yes | No | Yes | No | Yes | Yes | No | Yes | No | Yes | No |
| Services Liberalization: 50% multilateral reduction of discriminatory barriers by EACU | No | No | No | No | No | Yes | Yes | No | No | No | No | No |
| Non-Tariff Barriers: 20% reduction of costs within EACU (Tripartite) countries* | No | Yes | No | No | Yes | Yes | No | Yes | Yes | No | No | Yes |
| Non-Tariff Barriers: 20% multiltateral reduction of NTB costs by EACU countries | No | No | No | No | No | Yes | No | Yes | No | No | No | No |
| **Change in Real Value of Consumption** | | | | | | | | | | | | |
| (measured by Hicksian Equivalent variation divided by initial value of consumption) | | | | | | | | | | | | |
| Kenya | 0.00 | 0.96 | 0.67 | 0.04 | 0.10 | 1.82 | 0.98 | 0.13 | 3.08 | 1.34 | 1.36 | 0.25 |
| Tanzania | 0.00 | 0.96 | 0.64 | 0.03 | 0.18 | 7.18 | 1.23 | 5.12 | 2.27 | 1.11 | 0.13 | 0.62 |
| Uganda | 0.00 | 1.30 | 1.19 | 0.04 | 0.05 | 2.85 | 1.55 | 0.03 | 2.53 | 2.01 | 0.17 | 0.14 |
| Rwanda | 0.00 | 1.45 | 1.25 | 0.13 | 0.03 | 4.98 | 3.34 | 0.28 | 2.40 | 1.84 | 0.22 | 0.06 |
| COMESA | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 1.48 | 0.33 | 1.00 | 0.04 |
| SADC | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.84 | 0.57 | 0.23 | 0.03 |
| **Unskilled Wage** | | | | | | | | | | | | |
| Agriculture | | | | | | | | | | | | |
| Kenya | 0.00 | 1.34 | 1.32 | 0.01 | -0.04 | 2.03 | 0.63 | 0.05 | 3.26 | 2.39 | 0.08 | 0.95 |
| Tanzania | 0.00 | 1.28 | 0.80 | 0.00 | 0.37 | 4.76 | 0.48 | 3.33 | 2.46 | 1.26 | 0.03 | 0.77 |
| Uganda | 0.00 | 3.64 | 3.40 | 0.01 | 0.19 | 4.61 | 0.90 | 0.01 | 7.66 | 5.82 | 0.08 | 0.82 |
| Rwanda | 0.00 | 2.24 | 2.00 | 0.06 | 0.07 | 3.91 | 1.68 | 0.26 | 8.53 | 6.44 | 0.10 | 0.20 |
| COMESA | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.47 | 0.60 | 0.87 | 0.00 |
| SADC | 0.00 | -0.01 | -0.01 | 0.00 | 0.00 | -0.01 | 0.00 | 0.00 | 2.30 | 1.33 | 0.10 | 0.12 |
| Non-Agriculture | | | | | | | | | | | | |
| Kenya | 0.00 | 0.85 | 0.72 | 0.01 | 0.05 | 1.23 | 0.40 | 0.09 | 1.66 | 1.24 | 0.10 | 0.28 |
| Tanzania | 0.00 | 0.89 | 0.43 | 0.00 | 0.27 | 4.58 | 0.58 | 3.37 | 1.77 | 0.72 | 0.05 | 0.64 |
| Uganda | 0.00 | 1.55 | 1.46 | 0.02 | 0.05 | 2.44 | 0.89 | 0.02 | 2.91 | 2.29 | 0.10 | 0.22 |
| Rwanda | 0.00 | 1.54 | 1.40 | 0.05 | 0.06 | 3.08 | 1.33 | 0.24 | 2.04 | 1.74 | 0.10 | 0.06 |
| COMESA | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.35 | 0.32 | 0.89 | 0.04 |
| SADC | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.27 | 0.08 | 0.02 |

## Table 3 (continued): Deep Integration within the Tripartite FTA and the East Africa Customs Union (EAC) and Unilateral Reforms by the EAC: Near Term Results-- (Results are percentage change from initial equilibrium)

| Scenario definition | Benchmark | EACU Central: (Trade Facilitation plus services and NTB liberalization) | EACU: only Trade Facilita-tion** | EACU: only services liberaliza-tion | EACU: only NTB liberaliza-tion | EACU Liberal: Multilateral services and NTM refrom plus Trade Facilitation within EACU | EACU Liberal: only services liberaliza-tion | EACU Liberal: only NTB liberaliza-tion | Tripartite central: Trade Facilitation plus services and NTB liberalization | Tripartite: only Trade Facilitation | Tripartite: only services liberaliza-tion | Tripartite: only NTB liberaliza-tion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Skilled Wage** | | | | | | | | | | | | |
| Agriculture | | | | | | | | | | | | |
| Kenya | 0.00 | 0.56 | 0.59 | 0.01 | -0.07 | 1.11 | 0.47 | 0.06 | 1.27 | 1.09 | 0.04 | 0.15 |
| Tanzania | 0.00 | 1.09 | 0.55 | 0.00 | 0.35 | 4.98 | 0.35 | 3.83 | 2.10 | 0.88 | 0.01 | 0.79 |
| Uganda | 0.00 | 1.59 | 1.54 | 0.01 | 0.05 | 2.52 | 0.91 | 0.01 | 2.99 | 2.41 | 0.09 | 0.24 |
| Rwanda | 0.00 | 1.87 | 1.69 | 0.07 | 0.08 | 3.39 | 1.28 | 0.31 | 1.38 | 1.41 | 0.12 | 0.07 |
| COMESA | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.56 | 0.50 | 0.98 | 0.02 |
| SADC | 0.00 | -0.01 | -0.01 | 0.00 | 0.00 | -0.01 | 0.00 | 0.00 | 1.98 | 1.15 | 0.10 | 0.09 |
| Non-Agriculture | | | | | | | | | | | | |
| Kenya | 0.00 | -0.11 | -0.11 | 0.01 | -0.03 | 0.19 | 0.26 | 0.09 | -0.56 | -0.20 | 0.04 | -0.62 |
| Tanzania | 0.00 | 0.76 | 0.21 | 0.00 | 0.28 | 4.98 | 0.34 | 4.11 | 1.50 | 0.36 | 0.01 | 0.73 |
| Uganda | 0.00 | -0.42 | -0.31 | 0.02 | -0.10 | 0.45 | 0.92 | 0.01 | -1.19 | -0.79 | 0.11 | -0.36 |
| Rwanda | 0.00 | 1.37 | 1.27 | 0.07 | 0.08 | 2.77 | 0.92 | 0.33 | -3.83 | -2.54 | 0.13 | -0.06 |
| COMESA | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.50 | 0.24 | 1.06 | 0.07 |
| SADC | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.09 | 0.09 | -0.01 |
| **Price** | | | | | | | | | | | | |
| Food | | | | | | | | | | | | |
| Kenya | 0.00 | 0.38 | 0.22 | 0.01 | 0.08 | 0.62 | 0.26 | 0.11 | 0.60 | 0.33 | 0.15 | 0.02 |
| Tanzania | 0.00 | 0.28 | 0.28 | 0.01 | -0.02 | 2.05 | 0.43 | 1.39 | 0.81 | 0.46 | 0.04 | 0.17 |
| Uganda | 0.00 | 0.72 | 0.60 | 0.00 | 0.08 | 1.17 | 0.41 | 0.07 | 0.92 | 0.70 | 0.08 | 0.16 |
| Rwanda | 0.00 | -0.50 | -0.44 | 0.02 | -0.05 | -0.28 | 0.17 | -0.03 | -1.64 | -1.32 | 0.06 | -0.04 |
| COMESA | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.77 | 0.06 | 0.71 | -0.01 |
| SADC | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.23 | 0.12 | 0.07 | 0.02 |
| Non-Food | | | | | | | | | | | | |
| Kenya | 0.00 | 0.38 | 0.26 | 0.00 | 0.06 | 0.38 | 0.06 | 0.05 | 0.35 | 0.29 | 0.00 | 0.01 |
| Tanzania | 0.00 | 0.60 | 0.30 | 0.00 | 0.17 | 2.25 | -0.35 | 2.17 | 1.06 | 0.51 | -0.04 | 0.36 |
| Uganda | 0.00 | 0.23 | 0.24 | -0.01 | -0.01 | 0.51 | 0.27 | 0.01 | 0.40 | 0.35 | 0.03 | -0.04 |
| Rwanda | 0.00 | 0.86 | 0.82 | -0.02 | 0.04 | 1.00 | -0.01 | 0.14 | 0.63 | 0.63 | -0.02 | 0.02 |
| COMESA | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.79 | 0.07 | 0.63 | 0.02 |
| SADC | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.08 | 0.02 | 0.00 |

*Reductions apply to the EACU countries or the Tripartite countries depending on whether the scenario is EACU or Tripartite.

** Trade facilitation within EACU is part of the "EACU liberal" scenario also.

**Source: Authors' estimates**

## Table 3 (continued): Deep Integration within the Tripartite FTA and the East Africa Customs Union (EAC) and Unilateral Reforms by the EACU : Near Term Results-- (Results are percentage change from initial equilibrium)

| Scenario definition | Benchmark | EACU Central: (Trade Facilitation plus services and NTB liberalization) | EACU: only Trade Facilita-tion** | EACU: only services liberaliza-tion | EACU: only NTB liberaliza-tion | EACU Liberal: (Multilateral services, NTM refrom plus Trade Facilitation within EACU) | EACU Liberal: only services liberaliza-tion | EACU Liberal: only NTB liberaliza-tion | Tripartite central : Trade Facilitation plus services and NTB liberalization | Tripartite: only Trade Facilitation | Tripartite: only services liberaliza-tion | Tripartite: only NTB liberaliza-tion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Aggregate trade** | | | | | | | | | | | | |
| Aggregate exports | | | | | | | | | | | | |
| Kenya | 0.0 | 6.05 | 4.40 | 0.02 | 1.07 | 7.67 | 2.52 | 0.47 | 5.8 | 6.2 | -2.3 | 1.4 |
| Tanzania | 0.0 | 5.53 | 2.69 | -0.03 | 1.80 | 16.37 | 2.53 | 10.23 | 10.0 | 4.9 | 0.2 | 3.3 |
| Uganda | 0.0 | 5.18 | 4.88 | 0.02 | 0.07 | 7.97 | 2.95 | 0.05 | 7.7 | 6.9 | 0.1 | 0.2 |
| Rwanda | 0.0 | 9.26 | 8.52 | 0.17 | 0.38 | 19.62 | 9.79 | 0.99 | 11.7 | 10.1 | 0.4 | 0.4 |
| COMESA | 0.0 | -0.01 | 0.00 | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 | 3.3 | 1.8 | 0.8 | 0.3 |
| SADC | 0.0 | 0.01 | 0.02 | 0.00 | 0.00 | 0.04 | 0.00 | 0.02 | 2.6 | 2.3 | 0.1 | 0.1 |
| **Factor earnings** | | | | | | | | | | | | |
| Kenya | | | | | | | | | | | | |
| Capital | 0.0 | 1.36 | 0.87 | 0.03 | 0.30 | 1.19 | 0.19 | 0.09 | 4.5 | 1.5 | 2.1 | 0.7 |
| Unskilled labor | 0.0 | 1.47 | 1.30 | 0.01 | 0.09 | 1.53 | 0.19 | 0.02 | 3.9 | 2.4 | 0.3 | 1.2 |
| Skilled labor | 0.0 | 0.31 | 0.21 | 0.01 | 0.04 | 0.17 | -0.05 | 0.04 | 1.0 | 0.5 | 0.2 | 0.0 |
| Resource | 0.0 | 2.58 | 2.47 | 0.01 | 0.07 | 3.14 | 0.59 | 0.06 | 6.8 | 4.5 | 0.2 | 2.4 |
| Tanzania | | | | | | | | | | | | |
| Capital | 0.0 | 0.08 | 0.35 | 0.04 | -0.19 | -0.25 | 0.31 | -0.89 | 0.6 | 0.9 | 0.1 | -0.3 |
| Unskilled labor | 0.0 | 0.55 | 0.56 | 0.01 | 0.06 | 1.29 | 0.32 | 0.39 | 1.3 | 1.0 | 0.0 | 0.2 |
| Skilled labor | 0.0 | 0.28 | 0.19 | 0.01 | 0.04 | 1.60 | 0.12 | 1.12 | 0.8 | 0.4 | 0.0 | 0.2 |
| Resource | 0.0 | -0.33 | 0.56 | 0.00 | -0.61 | -0.03 | 0.32 | -0.63 | 0.1 | 0.9 | 0.0 | -0.6 |
| Uganda | | | | | | | | | | | | |
| Capital | 0.0 | 1.67 | 1.40 | 0.04 | 0.11 | 2.12 | 0.67 | 0.04 | 3.5 | 2.5 | 0.1 | 0.3 |
| Unskilled labor | 0.0 | 4.14 | 3.74 | 0.01 | 0.25 | 4.22 | 0.22 | 0.03 | 9.3 | 6.8 | 0.0 | 1.0 |
| Skilled labor | 0.0 | 1.15 | 1.03 | 0.02 | 0.04 | 1.19 | 0.25 | 0.02 | 2.7 | 1.9 | 0.1 | 0.1 |
| Resource | 0.0 | 1.84 | 1.92 | 0.02 | -0.03 | 2.72 | 0.69 | 0.01 | 1.6 | 1.8 | 0.0 | -0.1 |
| Rwanda | | | | | | | | | | | | |
| Capital | 0.0 | -0.33 | -0.45 | 0.16 | -0.06 | 3.21 | 3.76 | -0.19 | 2.4 | 1.2 | 0.2 | 0.0 |
| Unskilled labor | 0.0 | 1.10 | 0.94 | 0.06 | 0.00 | 2.20 | 1.35 | 0.00 | 10.2 | 7.1 | 0.1 | 0.2 |
| Skilled labor | 0.0 | 0.54 | 0.47 | 0.07 | 0.02 | 1.44 | 0.74 | 0.09 | 0.2 | 0.0 | 0.1 | 0.0 |
| Resource | 0.0 | 2.88 | 2.71 | 0.11 | 0.06 | 7.33 | 4.70 | 0.18 | 1.2 | 1.6 | 0.2 | 0.0 |
| COMESA | | | | | | | | | | | | |
| Capital | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.1 | 0.3 | 0.0 |
| Unskilled labor | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.4 | 0.2 | 0.0 |
| Skilled labor | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 0.2 | 0.4 | 0.0 |
| Resource | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.4 | 0.0 | 0.0 |
| SADC | | | | | | | | | | | | |
| Capital | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.6 | 0.2 | 0.1 |
| Unskilled labor | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.7 | 0.1 | 0.1 |
| Skilled labor | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.4 | 0.1 | 0.0 |
| Resource | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.0 | 0.0 |

*Reductions apply to the EACU countries or the Tripartite countries depending on whether the scenario is EACU or Tripartite.

** Trade facilitation within EACU is part of the "EACU liberal" scenario also.

**Source: Authors' estimates**

## Table 4: Deep Integration within the Tripartite FTA and the East Africa Customs Union (EAC) and Unilateral Reforms by the EACU

**Results for 2030 -- (Trade Policy Results are percentage change from Business as Usual equilibrium for 2030; Business as Usual Results are percentage change from initial equilibrium in 2015)**

| Scenario definition | Business as Usual: (only labor and capital expansion) | EACU Central: (Trade Facilitation plus services and NTB liberalization) | EACU: only Trade Facilita-tion** | EACU: only services liberaliza-tion | EACU: only NTB liberaliza-tion | EACU Liberal: Multilateral services and NTM refrom plus Trade Facilitation within EACU | EACU Liberal: only services liberaliza-tion | EACU Liberal: only NTB liberaliza-tion | Tripartite central: Trade Facilitation plus services and NTB liberalization | Tripartite: only Trade Facilitation | Tripartite: only services liberaliza-tion | Tripartite: only NTB liberaliza-tion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time in Trade Costs: 20% reduction within EACU (Tripartite) countries*** | No | Yes | Yes | No | No | Yes | No | No | Yes | Yes | No | No |
| **Time in Trade Costs: 5% reduction with non-EACU (Tripartite) countries*** | No | Yes | Yes | No | No | Yes | No | No | Yes | Yes | No | No |
| **Services Liberalization: 50% reduction of discriminatory barriers within EACU (Tripartite)*** | No | Yes | No | Yes | No | Yes | Yes | No | Yes | No | Yes | No |
| **Services Liberalization: 50% multilateral reduction of discriminatory barriers by EACU** | No | No | No | No | No | Yes | Yes | No | No | No | No | No |
| **Non-Tariff Barriers: 20% reduction of costs within EACU (Tripartite) countries*** | No | Yes | No | No | Yes | Yes | No | Yes | Yes | No | No | Yes |
| **Non-Tariff Barriers: 20% multiltateral reduction of NTB costs by EACU countries** | No | No | No | No | No | Yes | No | Yes | No | No | No | No |
| **Change in Real Value of Per Capita Consumption** | | | | | | | | | | | | |
| Measured by Hicksian Equivalent variation divided by Population Increase and Initial Value of Consumption | | | | | | | | | | | | |
| Kenya | 45.40 | 3.78 | 2.23 | 0.23 | 0.90 | 8.30 | 5.38 | 0.47 | 7.46 | 3.72 | 2.31 | 1.02 |
| Tanzania | 20.75 | 1.76 | 1.08 | 0.03 | 0.37 | 9.68 | 2.35 | 5.69 | 4.47 | 2.33 | 0.30 | 0.99 |
| Uganda | 37.10 | 1.01 | 0.85 | 0.16 | 0.05 | 6.46 | 5.39 | 0.13 | 3.80 | 3.22 | 0.39 | 0.11 |
| Rwanda | 17.39 | 2.15 | 1.62 | 0.32 | 0.07 | 11.11 | 8.40 | 0.22 | 3.37 | 2.28 | 0.48 | 0.17 |
| COMESA | 20.87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.39 | 0.32 | 1.90 | 0.04 |
| SADC | 45.42 | 0.00 | 0.01 | 0.00 | 0.00 | 0.04 | 0.01 | 0.02 | 1.55 | 1.01 | 0.52 | 0.08 |
| **Unskilled Wage** | | | | | | | | | | | | |
| Agriculture | | | | | | | | | | | | |
| Kenya | 32.11 | 3.81 | 2.36 | 0.21 | 0.89 | 8.25 | 5.33 | 0.34 | 7.04 | 3.86 | 1.56 | 1.34 |
| Tanzania | 9.86 | 2.37 | 1.35 | 0.02 | 0.72 | 8.17 | 1.72 | 4.65 | 5.05 | 2.51 | 0.21 | 1.46 |
| Uganda | 16.39 | 5.44 | 4.64 | 0.10 | 0.31 | 8.61 | 3.64 | 0.10 | 8.38 | 6.47 | 0.29 | 0.78 |
| Rwanda | 9.78 | 3.11 | 2.38 | 0.24 | 0.11 | 8.91 | 6.46 | 0.16 | 11.34 | 7.97 | 0.35 | 0.33 |
| COMESA | 16.96 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 2.29 | 0.36 | 1.86 | 0.02 |
| SADC | 25.78 | 0.00 | 0.01 | 0.00 | 0.00 | 0.04 | 0.01 | 0.02 | 2.14 | 1.06 | 0.38 | 0.12 |
| Non-Agriculture | | | | | | | | | | | | |
| Kenya | 35.07 | 4.16 | 2.51 | 0.22 | 1.02 | 8.71 | 5.52 | 0.42 | 6.90 | 3.80 | 1.50 | 1.25 |
| Tanzania | 10.00 | 1.92 | 1.08 | 0.02 | 0.52 | 8.09 | 1.96 | 4.57 | 4.61 | 2.32 | 0.26 | 1.18 |
| Uganda | 18.30 | 3.41 | 2.87 | 0.11 | 0.21 | 6.95 | 3.79 | 0.12 | 6.01 | 4.70 | 0.31 | 0.51 |
| Rwanda | 9.86 | 2.40 | 1.83 | 0.27 | 0.08 | 9.37 | 6.94 | 0.13 | 5.75 | 4.05 | 0.39 | 0.22 |
| COMESA | 18.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 2.33 | 0.25 | 1.94 | 0.02 |
| SADC | 25.59 | 0.00 | 0.01 | 0.00 | 0.00 | 0.03 | 0.00 | 0.01 | 1.17 | 0.72 | 0.38 | 0.08 |

**Table 4 (continued): Deep Integration within the Tripartite FTA and the East Africa Customs Union (EAC) and Unilateral Reforms by the EAC, Results for 2030 -- (Trade Policy Results are percentage change from Business as Usual equilibrium for 2030; Business as Usual Results are percentage change from initial equilibrium in 2015)**

| Scenario definition | Business as Usual: (only labor and capital expansion) | EACU Central: (Trade Facilitation plus services and NTB liberalization) | EACU: only Trade Facilita-tion** | EACU: only services liberaliza-tion | EACU: only NTB liberaliza-tion | EACU Liberal: Multilateral services and NTM refrom plus Trade Facilitation within EACU | EACU Liberal: only services liberaliza-tion | EACU Liberal: only NTB liberaliza-tion | Tripartite central: Trade Facilitation plus services and NTB liberalization | Tripartite: only Trade Facilitation | Tripartite: only services liberaliza-tion | Tripartite: only NTB liberaliza-tion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Skilled Wage** | | | | | | | | | | | | |
| Agriculture | | | | | | | | | | | | |
| Kenya | 16.20 | 2.48 | 1.49 | 0.18 | 0.50 | 5.91 | 3.93 | 0.30 | 4.30 | 2.24 | 1.19 | 0.41 |
| Tanzania | 6.15 | 1.71 | 0.83 | 0.03 | 0.47 | 8.54 | 2.00 | 5.17 | 4.29 | 2.05 | 0.23 | 1.15 |
| Uganda | 10.97 | 0.43 | 0.40 | 0.11 | 0.00 | 4.01 | 3.47 | 0.09 | 2.08 | 1.85 | 0.30 | -0.03 |
| Rwanda | 3.16 | 2.30 | 2.02 | 0.31 | 0.13 | 10.01 | 6.19 | 0.34 | -4.52 | -2.79 | 0.47 | 0.05 |
| COMESA | -2.06 | 0.01 | 0.01 | 0.00 | 0.00 | 0.02 | 0.01 | 0.00 | 2.28 | 0.31 | 1.79 | 0.05 |
| SADC | 13.94 | 0.00 | 0.01 | 0.00 | 0.00 | 0.03 | 0.01 | 0.01 | 1.61 | 0.86 | 0.35 | 0.09 |
| Non-Agriculture | | | | | | | | | | | | |
| Kenya | 17.12 | 2.49 | 1.46 | 0.18 | 0.52 | 5.87 | 3.87 | 0.35 | 3.86 | 1.99 | 1.12 | 0.22 |
| Tanzania | 5.63 | 1.35 | 0.60 | 0.03 | 0.31 | 8.55 | 2.19 | 5.20 | 3.92 | 1.87 | 0.26 | 0.94 |
| Uganda | 11.96 | -1.41 | -1.20 | 0.12 | -0.11 | 2.43 | 3.54 | 0.09 | -0.10 | 0.19 | 0.31 | -0.32 |
| Rwanda | 2.88 | 1.91 | 1.76 | 0.33 | 0.13 | 10.49 | 6.41 | 0.36 | -8.35 | -5.62 | 0.50 | -0.03 |
| COMESA | -1.81 | 0.00 | 0.01 | 0.00 | 0.00 | 0.02 | 0.01 | 0.00 | 2.36 | 0.24 | 1.88 | 0.05 |
| SADC | 12.77 | 0.01 | 0.01 | 0.00 | 0.00 | 0.03 | 0.00 | 0.01 | 0.79 | 0.56 | 0.34 | 0.05 |
| **Price** | | | | | | | | | | | | |
| Food | | | | | | | | | | | | |
| Kenya | -1.29 | 0.21 | 0.17 | -0.02 | 0.03 | -0.08 | -0.31 | 0.07 | 0.09 | 0.21 | -0.18 | 0.01 |
| Tanzania | 4.95 | 0.79 | 0.44 | 0.01 | 0.21 | 2.76 | 0.47 | 1.75 | 1.51 | 0.77 | 0.05 | 0.43 |
| Uganda | 4.17 | 0.94 | 0.83 | 0.00 | 0.06 | 1.46 | 0.56 | 0.03 | 1.50 | 1.20 | 0.07 | 0.13 |
| Rwanda | 2.92 | 0.07 | 0.06 | 0.01 | 0.01 | 0.07 | -0.15 | 0.02 | -0.38 | -0.27 | 0.01 | 0.02 |
| COMESA | 3.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.91 | 0.03 | 0.91 | 0.00 |
| SADC | 5.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.19 | 0.09 | 0.07 | 0.01 |
| Non-Food | | | | | | | | | | | | |
| Kenya | 5.37 | 0.45 | 0.29 | 0.01 | 0.09 | 0.69 | 0.31 | 0.09 | 0.59 | 0.37 | 0.09 | 0.08 |
| Tanzania | 5.50 | 0.69 | 0.36 | 0.01 | 0.17 | 2.17 | -0.05 | 1.71 | 1.36 | 0.74 | -0.01 | 0.34 |
| Uganda | 5.35 | 0.04 | 0.04 | -0.01 | 0.00 | 0.48 | 0.40 | 0.03 | 0.31 | 0.23 | 0.05 | 0.00 |
| Rwanda | 4.13 | 0.84 | 0.80 | 0.01 | 0.02 | 1.38 | 0.55 | 0.06 | 0.51 | 0.44 | 0.03 | 0.02 |
| COMESA | 3.57 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.08 | 0.84 | 0.01 |
| SADC | 5.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.15 | 0.10 | 0.06 | 0.01 |

*Reductions apply to the EACU countries or the Tripartite countries depending on whether the scenario is EACU or Tripartite.

** Trade facilitation within EACU is part of the "EACU liberal" scenario also.

**Source: Authors' estimates**

**Table 4 (continued): Deep Integration within the Tripartite FTA and the East Africa Customs Union (EAC) and Unilateral Reforms by the EAC, Results for 2030 -- (Trade Policy Results are percentage change from Business as Usual equilibrium for 2030; Business as Usual Results are percentage change from initial equilibrium in 2015)**

| Scenario definition | Business as Usual: (only labor and capital expansion) | EACU Central: (Trade Facilitation plus services and NTB liberalization) | EACU: only Trade Facilita-tion** | EACU: only services liberaliza-tion | EACU: only NTB liberaliza-tion | EACU Liberal: (Multilateral services, NTM refrom plus Trade Facilitation within EACU) | EACU Liberal: only services liberaliza-tion | EACU Liberal: only NTB liberaliza-tion | Tripartite central: Trade Facilitation plus services and NTB liberalization | Tripartite: only Trade Facilitation | Tripartite: only services liberaliza-tion | Tripartite: only NTB liberaliza-tion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Aggregate trade** | | | | | | | | | | | | |
| Aggregate exports | | | | | | | | | | | | |
| Kenya | 55.1 | 13.73 | 9.66 | 0.07 | 2.46 | 18.17 | 5.97 | 1.32 | 19.1 | 16.1 | -2.3 | 3.5 |
| Tanzania | 75.0 | 18.56 | 8.44 | -0.02 | 6.86 | 46.93 | 4.96 | 29.81 | 33.6 | 15.7 | 0.6 | 12.3 |
| Uganda | 57.3 | 18.67 | 17.79 | 0.04 | 0.32 | 26.35 | 6.98 | 0.35 | 27.1 | 24.2 | 0.2 | 0.6 |
| Rwanda | 64.0 | 33.94 | 31.03 | 0.39 | 2.09 | 70.96 | 25.68 | 4.19 | 43.4 | 38.1 | 0.8 | 2.4 |
| COMESA | 30.6 | 0.04 | 0.05 | 0.00 | -0.01 | 0.15 | 0.08 | 0.01 | 5.9 | 3.5 | 1.1 | 0.6 |
| SADC | 34.1 | 0.03 | 0.04 | 0.00 | -0.01 | 0.15 | 0.03 | 0.08 | 5.2 | 4.2 | 0.2 | 0.2 |
| **Factor earnings** | | | | | | | | | | | | |
| Kenya | | | | | | | | | | | | |
| Capital | 95.5 | 7.95 | 4.43 | 0.32 | 2.28 | 12.26 | 6.50 | 0.71 | 15.2 | 6.4 | 4.9 | 2.7 |
| Unskilled labor | 96.4 | 8.00 | 4.60 | 0.34 | 2.18 | 13.70 | 7.84 | 0.60 | 14.3 | 7.3 | 2.7 | 3.2 |
| Skilled labor | 88.7 | 5.99 | 3.31 | 0.30 | 1.55 | 10.59 | 6.10 | 0.58 | 10.0 | 4.8 | 2.3 | 1.6 |
| Resource | 97.9 | 11.65 | 7.66 | 0.33 | 2.90 | 20.86 | 9.34 | 1.78 | 19.2 | 12.0 | 2.0 | 4.3 |
| Tanzania | | | | | | | | | | | | |
| Capital | 82.4 | -0.21 | 0.97 | 0.09 | -0.95 | 5.25 | 3.80 | -0.24 | 4.6 | 4.5 | 0.6 | -1.4 |
| Unskilled labor | 70.8 | 1.89 | 1.74 | 0.04 | 0.22 | 6.89 | 2.50 | 2.20 | 6.1 | 4.2 | 0.4 | 0.7 |
| Skilled labor | 64.0 | 0.80 | 0.83 | 0.05 | -0.19 | 7.76 | 3.00 | 3.30 | 4.8 | 3.4 | 0.4 | 0.2 |
| Resource | 71.8 | 0.00 | 1.93 | 0.05 | -1.45 | 15.25 | 4.17 | 8.94 | 7.0 | 4.5 | 0.6 | 1.0 |
| Uganda | | | | | | | | | | | | |
| Capital | 97.6 | 2.68 | 2.07 | 0.26 | 0.20 | 10.51 | 7.80 | 0.24 | 10.5 | 8.1 | 0.5 | 0.5 |
| Unskilled labor | 87.4 | 11.24 | 9.30 | 0.18 | 0.73 | 15.32 | 5.23 | 0.22 | 19.8 | 14.7 | 0.4 | 1.9 |
| Skilled labor | 87.2 | 1.80 | 1.32 | 0.21 | 0.14 | 7.01 | 5.22 | 0.20 | 7.8 | 6.0 | 0.4 | 0.3 |
| Resource | 40.0 | -0.43 | 0.24 | 0.11 | -0.30 | 3.02 | 3.31 | -0.15 | -3.3 | -1.4 | 0.3 | -0.7 |
| Rwanda | | | | | | | | | | | | |
| Capital | 59.4 | -0.72 | -1.43 | 0.55 | -0.11 | 14.70 | 14.32 | -0.36 | 2.5 | 0.3 | 0.7 | 0.1 |
| Unskilled labor | 58.9 | 2.72 | 1.56 | 0.38 | 0.02 | 12.49 | 11.23 | -0.13 | 21.5 | 13.9 | 0.6 | 0.5 |
| Skilled labor | 55.5 | 1.58 | 1.16 | 0.51 | 0.08 | 15.03 | 11.18 | 0.20 | -5.6 | -4.3 | 0.8 | 0.0 |
| Resource | 40.2 | 9.73 | 9.05 | 0.80 | 0.23 | 50.40 | 38.10 | 0.62 | -1.9 | 1.5 | 1.2 | 0.1 |
| COMESA | | | | | | | | | | | | |
| Capital | 55.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 | -0.1 |
| Unskilled labor | 60.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 0.1 | 1.4 | -0.1 |
| Skilled labor | 54.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.1 | 1.8 | 0.0 |
| Resource | 37.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 0.5 | 0.5 | 0.1 |
| SADC | | | | | | | | | | | | |
| Capital | 73.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.4 | 1.5 | 0.6 | 0.2 |
| Unskilled labor | 77.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 1.7 | 0.5 | 0.2 |
| Skilled labor | 67.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 1.4 | 0.4 | 0.2 |
| Resource | 22.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.6 | 0.0 | -0.1 |

*Reductions apply to the EACU countries or the Tripartite countries depending on whether the scenario is EACU or Tripartite.

** Trade facilitation within EACU is part of the "EACU liberal" scenario also.

**Source: Authors' estimates**

**Table 5: Adjustment Costs Estimates and Benefit-Cost Calculations for Tanzania's Three Principal Trade Policy Options***

| | EAC Central | EAC Liberal | Tripartite |
|---|---|---|---|
| **1. Adjustment Costs as % of GDP** | 0.37 | 0.88 | 1.09 |
| **2. Equivalent Variation (EV) as % of consumption** | 0.95 | 7.11 | 2.5 |
| **3. Equivalent Variation (EV) as % of GDP** | 0.62 | 4.67 | 1.64 |
| **4. Present Value of EV as % of GDP**** | 9.5 | 71.5 | 25.1 |
| **5. Benefit-Cost Ratio (row 4 divided by row 1)** | **26** | **81.5** | **23** |

Source: Authors' calculations

*Results are based on estimates from the Near Term model.

**Seven percent discount factor into the infinite future. Row 4 = (Row 3)*[1.07/.07]

## Table 6. Poverty Percentage, Headcount and Shared Prosperity Results for Deep Integration within the Tripartite FTA and the East Africa Customs Union (EAC) and Unilateral Reforms by the EAC, Results for 2030

| Scenario definition | Business as Usual: only labor and capital expansion | EACU Central: (Trade Facilitation plus services and NTB liberaliza-tion) | EACU: only Trade Facilita-tion** | EACU: only services liberaliza-tion | EACU: only NTB liberaliza-tion | EACU Liberal: (Multilateral services, NTM refrom plus Trade Facilitation within EACU) | EACU Liberal: only services liberaliza-tion | EACU Liberal: only NTB liberaliza-tion | Tripartite central without tariff reform: Trade Facilitation plus services and NTB liberalization | Tripartite: only Trade Facilitation | Tripartite: only services liberaliza-tion | Tripartite: only NTB liberaliza-tion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time in Trade Costs: 20% reduction within EACU (Tripartite) countries*** | No | Yes | Yes | No | No | Yes | No | No | Yes | Yes | No | No |
| **Time in Trade Costs: 5% reduction with non-EACU (Tripartite) countries*** | No | Yes | Yes | No | No | Yes | No | No | Yes | Yes | No | No |
| **Services Liberalization: 50% reduction of discriminatory barriers within EACU (Tripartite)*** | No | Yes | No | Yes | No | Yes | Yes | No | Yes | No | Yes | No |
| **Services Liberalization: 50% multilateral reduction of discriminatory barriers by EACU** | No | No | No | No | No | Yes | Yes | No | No | No | No | No |
| **Non-Tariff Barriers: 20% reduction of costs within EACU (Tripartite) countries*** | No | Yes | No | No | Yes | Yes | No | Yes | Yes | No | No | Yes |
| **Non-Tariff Barriers: 20% multiltateral reduction of NTB costs by EACU countries** | No | No | No | No | No | Yes | No | Yes | No | No | No | No |
| **Tariff: 100% removal within the Tripartite regions** | No | No | No | No | No | No | No | No | No | No | No | No |
| **Headcount, (%)** | | | | | | | | | | | | |
| (and p.p. deviations with respect to Business as Usual scenario) | | | | | | | | | | | | |
| Kenya | **16.63** | -0.90 | -0.54 | -0.01 | -0.20 | -1.90 | -1.22 | -0.10 | -1.71 | -0.98 | -0.62 | -0.32 |
| Tanzania | **20.79** | -0.76 | -0.15 | 0.00 | -0.04 | -2.16 | -0.70 | -1.76 | -1.58 | -1.00 | -0.02 | -0.12 |
| Uganda | **14.73** | -1.28 | -1.10 | -0.03 | -0.04 | -2.64 | -1.79 | -0.03 | -2.12 | -1.76 | -0.13 | -0.17 |
| Rwanda | **51.66** | -1.11 | -0.84 | -0.13 | -0.03 | -3.93 | -3.10 | -0.09 | -2.70 | -1.98 | -0.23 | -0.09 |
| COMESA | **8.48** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.63 | -0.09 | -0.47 | 0.00 |
| SADC | **40.92** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.50 | -0.31 | -0.15 | -0.02 |
| **Poverty, millions of people** | | | | | | | | | | | | |
| (and deviations with respect to Business as Usual scenario, millions) | | | | | | | | | | | | |
| Kenya | **10.98** | -0.60 | -0.36 | -0.01 | -0.13 | -1.26 | -0.81 | -0.06 | -1.13 | -0.64 | -0.41 | -0.21 |
| Tanzania | **16.41** | -0.60 | -0.12 | 0.00 | -0.03 | -1.70 | -0.55 | -1.39 | -1.25 | -0.79 | -0.02 | -0.10 |
| Uganda | **9.28** | -0.80 | -0.69 | -0.02 | -0.02 | -1.66 | -1.13 | -0.02 | -1.34 | -1.11 | -0.08 | -0.11 |
| Rwanda | **9.14** | -0.20 | -0.15 | -0.02 | 0.00 | -0.69 | -0.55 | -0.02 | -0.48 | -0.35 | -0.04 | -0.02 |
| COMESA | **21.58** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -1.60 | -0.23 | -1.18 | -0.01 |
| SADC | **134.41** | 0.00 | -0.01 | 0.00 | 0.00 | -0.02 | 0.00 | -0.01 | -1.63 | -1.00 | -0.49 | -0.06 |
| **Change in Real Value of Per Capita Consumption** | | | | | | | | | | | | |
| Measured by Hicksian Equivalent variation divided by Population Increase and Initial Value of Consumption | | | | | | | | | | | | |
| Kenya | **45.40** | 3.78 | 2.23 | 0.23 | 0.90 | 8.30 | 5.38 | 0.47 | 7.46 | 3.72 | 2.31 | 1.02 |
| Tanzania | **20.75** | 1.76 | 1.08 | 0.03 | 0.37 | 9.68 | 2.35 | 5.69 | 4.47 | 2.33 | 0.30 | 0.99 |
| Uganda | **37.10** | 1.01 | 0.85 | 0.16 | 0.05 | 6.46 | 5.39 | 0.13 | 3.80 | 3.22 | 0.39 | 0.11 |
| Rwanda | **17.39** | 2.15 | 1.62 | 0.32 | 0.07 | 11.11 | 8.40 | 0.22 | 3.37 | 2.28 | 0.48 | 0.17 |
| COMESA | **20.87** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.39 | 0.32 | 1.90 | 0.04 |
| SADC | **45.42** | 0.00 | 0.01 | 0.00 | 0.00 | 0.04 | 0.01 | 0.02 | 1.55 | 1.01 | 0.52 | 0.08 |
| **Change in Real Value of Per Capita Consumption of Bottom 40% of income distribution** | | | | | | | | | | | | |
| Measured by Hicksian Equivalent variation divided by Population Increase and Initial Value of Consumption | | | | | | | | | | | | |
| Kenya | **40.00** | 3.79 | 2.25 | 0.23 | 0.91 | 8.22 | 5.36 | 0.42 | 7.70 | 3.87 | 2.33 | 1.22 |
| Tanzania | **16.53** | 1.80 | 1.07 | 0.03 | 0.35 | 8.95 | 1.72 | 5.10 | 4.08 | 2.35 | 0.30 | 0.98 |
| Uganda | **25.01** | 2.79 | 2.38 | 0.15 | 0.17 | 7.54 | 4.80 | 0.13 | 5.67 | 4.56 | 0.34 | 0.41 |
| Rwanda | **8.41** | 2.32 | 1.73 | 0.28 | 0.07 | 9.82 | 7.60 | 0.18 | 7.15 | 4.93 | 0.41 | 0.23 |
| COMESA | **15.95** | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.21 | 0.35 | 1.79 | 0.03 |
| SADC | **44.06** | -0.01 | 0.00 | -0.07 | -0.01 | 0.03 | -0.01 | 0.01 | 1.51 | 0.89 | 0.42 | 0.06 |

*Reductions apply to the EACU countries or the Tripartite countries depending on whether the scenario is EACU or Tripartite.

** Trade facilitation within EACU is part of the "EACU liberal" scenario also.

**Source: Authors' estimates**

## Table 7: Piecemeal Sensitivity Analysis: Impact on Tanzania of EACU Deep Integration, Tripartite FTA Deep Integration and EACU Unilateral Liberalization

| | | | | Equivalent Variation as a % of Consumption | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Parameter Value | | | EAC Deep Integration | | | EAC Liberal | | | Tripartite Integration | | |
| Parameter | Lower | Central | Upper | Lower | Central | Upper | Lower | Central | Upper | Lower | Central | Upper |
| $\sigma(q_i, q_j)$ – services sectors | 2 | 3 | 4 | 0.95 | 0.95 | 0.95 | 7.13 | 7.11 | 7.11 | 2.51 | 2.50 | 2.49 |
| $\sigma(q_i, q_j)$ – goods sectors | see below | | | 0.85 | 0.95 | 1.06 | 6.76 | 7.11 | 7.64 | 2.13 | 2.50 | 2.96 |
| σ(va, bs) | 0.625 | 1.25 | 1.875 | 0.95 | 0.95 | 0.95 | 7.08 | 7.11 | 7.14 | 2.50 | 2.50 | 2.50 |
| σ(D, M) | see below | | | 0.94 | 0.95 | 0.95 | 7.10 | 7.11 | 7.13 | 2.48 | 2.50 | 2.52 |
| σ(M, M) | GTAP values | 30 | | 0.98 | 0.95 | NA | 7.04 | 7.11 | NA | 2.37 | 2.50 | NA |
| σ(L, K) | 0.5 | 1 | 1.5 | 0.95 | 0.95 | 0.95 | 7.12 | 7.11 | 7.11 | 2.51 | 2.50 | 2.50 |
| $\sigma(A_1,\ldots A_n)$ | 0 | 0 | 0.25 | NA | 0.95 | 0.95 | NA | 7.11 | 7.14 | NA | 2.50 | 2.51 |
| $\varepsilon_{EACU}, \varepsilon_{COMESA}, \varepsilon_{SADC}$ | Lower (upper) values are 0.5 (1.5) central values | | | 0.97 | 0.95 | 0.93 | 7.10 | 7.11 | 7.09 | 2.54 | 2.50 | 2.48 |
| $\varepsilon_{EU}, \varepsilon_{ROW}, \varepsilon_{USA}, \varepsilon_{CHINA}$ | | | | | | | | | | | | |
| $\theta_r$ = share of rents captured | 0 | 0 | 1 | NA | 0.95 | 0.68 | NA | 7.11 | 1.05 | NA | 2.50 | 1.59 |
| $\theta_m$ | 0.025 | 0.05 | 0.075 | 0.95 | 0.95 | 0.95 | 7.11 | 7.11 | 7.11 | 2.50 | 2.50 | 2.50 |

| **$\sigma(q_i, q_j)$ – IRTS goods** | **Parameter Value** | | |
|---|---|---|---|
| chemicals and metals | 3.4 | 6.8 | 10.2 |
| energy and minerals | 5.8 | 11.6 | 17.4 |
| food products | 2.6 | 5.1 | 7.7 |
| petroleum and coal prod. | 2.1 | 4.2 | 6.3 |
| other manufacturing | 3.9 | 7.7 | 11.6 |
| textiles, apparel and leather | 3.8 | 7.6 | 11.4 |
| wood and paper products | 3.2 | 6.3 | 9.5 |

| **σ(D, M)–CRTS sectors** | **Parameter Value** | | |
|---|---|---|---|
| | Lower | Central | Upper |
| agriculture and forestry | 1.3 | 2.5 | 3.8 |
| other services | 0.8 | 1.5 | 2.3 |
| trade | 0.8 | 1.5 | 2.3 |
| utilities | 1.4 | 2.8 | 4.2 |

**Key:**

$\sigma(q_i, q_j)$: Elasticity of substitution between firm varieties in imperfectly competitive sectors

σ(va, bs): Elasticity of substitution between value-added and business services

σ(D, M): Elasticity of substitution between domestic goods and imports in CRTS sectors

σ(M, M): Elasticity of substitution between imports from different regions in CRTS sectors

σ(L, K): Elasticity of substitution between primary factors of production in value added

$\sigma(A_1,\ldots A_n)$: Elasticity of substitution in intermediate production between composite Armington aggregate goods

$\varepsilon_{ROW}, \varepsilon_{EU}, \varepsilon_{CHINA}, \varepsilon_{USA}$ $\varepsilon_{EACU}, \varepsilon_{COMESA}, \varepsilon_{SADC}$: Vectors of elasticities of imperfectly competitive firms' supply in the Rest World, EU, China. USA, EACU, COMESA and SADC with respect to the price of their outputs.

$\theta_r$: Share of rents in services sectors captured by domestic agents

$\theta_m$: Shares of value added in multinational firms due to specialized primary factor imports

Source: Authors' estimates.